Librarius 2000 Plus

Development & User Manual

BY
Tinovimba G Motsi
www.geocities.com/tgmotsi

Preface

From its humble beginnings as a QBASIC program in 1996 to the 2000 16 bit version, Librarius 2000 has been a relatively unstable system. This instability was mainly a result of faulty designs and poor testing. This upgrade was undertaken primarily to address instability and give the system a modern look and feel. Most of the code however clearly remains 16-bit with particular reference to the database management routines. The interface on the other hand has been completely overhauled with the third party custom controls that were the source of many problems being removed. Work was also carried out on the look and feel with particular reference to database initialisation and the Options window in the main program.

Installation has been a major concern and although this version does address most of the problems in the last one by sticking to the Visual Basic packaging and deployment wizard, the registry remains a problem. It has been noted that the system has a problem with the registration of msjro.dll and work is currently in progress to identify the source of the problem. The other problem area of Report preparation has finally been addressed to what should be a satisfactory level. A facility for resetting the printer has also been included to give the user a recovery route in the event of errors. The online help system has been rewritten and this version should contain very few errors if any in terms of links. If you do happen to come across one then please do send a bug report through the feedback page on the site. Formatting with particular reference to indentions remains a problem and is being looked into.

The system documentation has been revised to accommodate the changes made. The research documents have been moved from their Appendix into the main body of the first section. This should allow for easier reading. Designs have been revised and a substantial amount of errors in the algorithms has been identified and removed. The test strategy remains largely unchanged; as the opinion of the author was that the problem was with the implementation and not in the actual design of the tests. The results have been relocated to Appendix B and the Test data is in Appendix A. The appendices are available as a separate download. The source code is also available as a separate download. Included in the source code are all the help project files for the Help system. The installation program download also includes the testing database in the form of a backup file that can be restored using the Librarius 2000 Restore Facility.

As outlined above, substantial progress has been made towards making the system stable. Work is still however underway and further revisions will be implemented over the next couple of months. Please check the site occasionally for updates.

Tinovimba G Motsi
May 2002

Acknowledgements

First and foremost I would like to thank my mother and brother, Maradza, for all their support over the duration of this project. I would also like to thank my friend Chancemore Matonhodze for his assistance with some of the bugs in the development 2000 version. I am also indebted to the following for their contributions at various stages:

Research

Mr B Beira of Mucheke Public Library
Mr Muchemwa of the Margaret Sharpe Library
Mrs L E John of the Civic Center Library
Mrs Beverly and Judith of Mkwasine Country Club

Implementation 1998

Mr Ndlovu, Mr Mureyani both formerly of Victoria High School

Implementation 2000

Mr Madzima, Mr Museba and Mr Munodawafa all formerly of Victoria High School
Mr Shumbaimwe and Mr Chamboko of Victoria High School

Revision 2002

The technical support staff in the Department of Computer Science at the University of Zimbabwe with particular reference to Mr Chinyama and Mr Sidimeli.

In the loving memory of my Father

Q *I've always tried to teach you two things; first, never let them see you bleed.*

Bond *And the second?*

Q *Always have an escape plan .*

from The World is Not Enough

Preface i
Acknowledgements ii
Research ii
Implementation 1998 ii
Implementation 2000 ii
Revision 2002 ii
PROBLEM FORMULATION, ANALYSIS AND SOLUTION 1
The Problem 2
Generalised Objectives 3
Research into the current systems 4
Introduction 4
Methods of research used 4
The Mucheke Public Library 6
The book loan system 7
Problems faced 8
Borrowers Card 9
Borrowers Form 10
Interview Script 11
The Margaret Sharpe Library 14
Problems Faced 15
Accession Book 16
Cataloguing Policy 17
Catalogue Cards 19
Interview Script 21
The Civic Centre Library 24
Problems faced 25
Interview Script 26
The Mkwasine Country Club Library 29
Problems Faced 29
Membership Cards 30
Generalised Evaluation 31
Advantages 31
Disadvantages 31
Comment on Evaluation 31
Alternatives to Computerisation 32
Worker Increase 32
Information Reorganisation 32
Conclusion 32
Specific Objectives 33
DESIGN 35
Introduction 36
Choice of Programming Language 37
Database Design 38
Identification of data items 38

© Motsi Tinovimba G

Books Records....38
Subscription Records....39
Book loans....40
Requisitions....40
System Identity....41
Security....41
The Grouping of Data Items....42
Table Design....43
Storing Durations....43
Setup Table....43
Main Transaction Log Table....45
Book records transaction log....46
Subscriber Transaction Log....47
Books table....48
Deregistered books table....48
Subscriptions Table....49
Terminated Subscriptions Table....49
User log table....49
Books Borrowed Table....50
Books Requested Table....50
Modulation....51
Introduction....51
File management....51
Loan and Requisition handling....51
System configuration....51
Search Utilities....52
Report writing....52
Security management....52
Database management....53
File Management....54
Books Records Management....54
Plan....54
Input Form....54
Algorithms as to Task....55
Sort Form....61
Locate Form....62
Report form....63
Subscriptions Records Management....64
Algorithms....65
Deregistered Books....67
Terminated Subscriptions....68
Deregister Book or Subscriber....69
Global Routines....70
General Global Routines....70
Validation Routines....71
Loan and Requisition Handling....73

© Motsi Tinovimba G

Borrowing form 73
Returning Books 76
Requisitions Form 78
Search Utilities 80
Search Form (Located in the main program) 80
Embedded Search Program 83
Search Results Form 85
Algorithms 85
Direct SQL Input Form 87
SQL Program : Results Form 89
Form 89
System Configuration 91
Installation Program 91
Database Initialisation 91
Setup form (Located in the main Program) 92
Change Password Form 94
The Report Writing Utilities 95
Main Report Form 95
General Algorithms 96
Algorithms : Reports Section 96
Algorithms: Mail Merge Section 99
Choose Report Fields Form 102
Report Program : Trim Fields Field Form 103
Report Program : Insert Fields 107
Transaction Viewing Utilities 108
Main Form 108
General log form 108
General filter form 111
Jump to page 112
Database Management Utilities 113
Repair and Optimise Form 113
Backup Form 114
Restore Utility Program 115
Test Strategy 117
Testing 119
Introduction 120
Subscriptions 120
Valid ranges 121
Testing the locate function 124
Books Form 126
Test range of Book number 126
Loan and requisition testing 132
Search Testing 137
Loan, requisition, subscription and book records 139
Preparations 139
Tests 139

© Motsi Tinovimba G

Transaction testing....141
Test 6.01 : Test User log maintenance....141
Testing procedure....141
Expected results....141
Test 6.02: Test subscriber log maintenance....142
Procedure....142
Expected Results....142
Test 6.03 : Test books log maintenance....143
Procedure....143
Expected Results....143
Test 6.04 : Main Log maintenance....144
Procedure....144
Expected Log Entries....144
The query utility....145
Test 7.01 : Query on the Main Database....145
Test 7.02: Query on the Transactions Database....145
The Report Utility....146
Test 8.01 : Mail merge....146
Procedure....146
Expected Results....146
Test 8.02 : The Report Builder....147
Procedure....147
Expected Results....147
NB: Please also study the reports in Test Data appendix....147
User Privileges....148
Test 9.01....148
Calendar Utility....148
Test 10.01....148
Backup and Restore....149
Test 11.01....149
Procedure....149
Expected results....149
Repair....149
Test 12.01....149
User Manual 151
Chapter 1: Getting Started....152
System Requirements....152
Installing the System....152
Initialising the databases....152
Customising Your System....156
The Formats Category....157
The Charges Category....158
The Limits Category....158
The Users Category....160
The Start up Category....161
Librarius 2000 Plus Components....162

© Motsi Tinovimba G

Chapter 2: 163
Managing Subscription And Book Records 163
Current Subscriptions 163
Entering a new subscription 163
Browsing through the subscription records 165
Editing subscription details 166
Terminating a subscription 167
Saving to Text or Printing the displayed subscription record 167
Terminated subscriptions 169
Managing Book Records: Books in the library and in circulation 170
Registering a new Book 170
Browsing through the book records 171
Editing a given book record 172
Deregistering a Book 172
Saving to a text file or Printing out the displayed record 172
Deregistered Books 173
Chapter 3: Loans And Requisitions 174
Making loans 174
Returns 176
Making Requisitions 177
Managing loans and requisitions 178
Changing the due date 179
To cancel a loan 180
All the above procedures also apply to Requisitions 180
Chapter 4: Finding Information 181
The Search Facility 181
The Query Utility 183
Main Database Table Structure 183
Transaction Database Structure 185
Use of columns in the Main Log 187
Executing a query 188
Chapter 5: Reports & Mail Merge 190
Text Editing 190
Opening an existing file 191
Saving a file 191
Beginning work on a new document 192
Printing the displayed Text 192
Changing the font 192
Finding a word or phrase in a document 193
Replacing every occurrence of a particular word or phrase 194
Inserting Dates and Text Files 194
Mail Merge 195
Reports 197
Chapter 6: 199
Setting Access Rights for Users 2 & 3 199
Chapter 7: 201

© Motsi Tinovimba G

Keeping Track - The Transactions Manager 201
The Main Log 201
Filtering records 203
The other logs 204
Chapter 8: Managing your databases 205
Optimising your databases 205
Repairing the databases 205
Backing up your databases 206
Restoring your databases 207
System Maintenance And Appraisal 211
Databases 212
Modules 212
Meeting the Objectives 212
Opportunities for Improvement 213
Installation 213
Setup 213
Subscriptions and Books 213
Loans and Requisitions 213
Direct SQL 213
Reports 214
Users 214
Transaction Logs 214

© Motsi Tinovimba G

PROBLEM FORMULATION, ANALYSIS AND SOLUTION

The Problem

The traditional systems used by the small libraries of Zimbabwe have become outdated and are beginning to be found seriously wanting as far as their efficiency is concerned. The volume of data which needs to be processed and stored has become so large that its management is now time consuming and laborious. The extraction of information has also become so slow that by the time the information is available, it will have become outdated and of limited if any use.

The heavy workload placed on the librarians is beginning to result in isolated but costly errors. Errors in the initial recording of transactions worsened by the systems' inability to detect or trace these errors within a reasonable time frame has led to the disappearance of many books without a trace. This has also led to people losing what little confidence they had left in the systems especially when they are accused of having borrowed books which the will have not. Some have also taken to manipulating these inadequacies so as to allow themselves to successfully defraud the libraries.

As far as change is concerned, these systems like most other traditional systems, lack the ability to assimilate new components into their structure. A slight modification will often require that an unreasonably large portion of the system, including components which will not even be directly related to the section needing modification, also be changed. Even after doing this, the resulting system will often still be problem ridden. It should also be noted that these traditional systems are heavily reliant on the experience of the librarians who use and probably designed them. If the librarians where to withdraw their services, these systems would virtually crash with no hope of recovery as the little remaining efficiency they portray would also go with the librarians.

Presented with the ever-increasing interest in literature which is increasing the amount of information managed by the librarians in terms of subscription and book records, it is obvious that these problems can only worsen with time. It is therefore necessary to modify or even replace these systems so as allow them to satisfactorily meet the demands of the future.

Generalised Objectives

Given the problem and current state of affairs, any change to the current system would have to be capable of fulfilling the following generalised objectives:

- Allow for the easier storage and management of large volumes of data.
- Be capable of processing large amounts of data quickly and efficiently.
- Be easy to use and modify.
- Be less prone to errors and capable of detecting and correcting them quickly if they should occur.
- Encourage and facilitate increased accountability.

Research into the current systems

Introduction

In undertaking my research into the current systems, I have chosen the four examples of the typical Zimbabwean library available to me and I have reason to believe that they represent most if not all of the Zimbabwean libraries. These libraries are

- The Mucheke Public Library
- The Victoria High School Margaret Sharpe Library
- The Civic Centre Library
- The Mkwasine Country Club Library

I happen to be well acquainted with the Mkwasine and Margaret Sharpe libraries and I believe that my knowledge of their operations and the predefined principles that limit their efficiency will be complementary to this research.

Methods of research used

The information presented on the research work carried out has been obtained through interviews with the librarians of the libraries under study, observation of the systems at work and inspection of the libraries' records. In some cases, I have also included information obtained from discussions with the libraries' subscribers. I had originally intended to use questionnaires but I dropped the idea after realising the inadequacies of the information that would be obtained if the librarians even bothered to reply at all. In the case of the Mkwasine Country Club, I was unable to hold a formal interview but I managed to gain access to the library's records and as I have been acquainted with the library for many years, I believe that this was sufficient.

In some cases, I was able to source copies of the documents used and I have included these as exhibits. Where I was unable to obtain the original documents, I have had to make do with sketches. I have also included certified interview scripts as proof of the authenticity of the information contained in the reports.

Each of the interviews I held focussed on obtaining the following information

- The name and organisational structure of the library.
- The approximate size of the library in terms of the number of registered books and subscribers.
- The categorisation of books and the membership schemes offered.
- The efficiency of a requisition system if present.
- The loaning and fining system used.
- The information concerning books and subscribers kept.
- The methods used in the storage of data.
- The methods of statistics collection and the type of information collected along with its uses.
- The computer literacy of the librarians.

This focus is reflected in the structure of the interview scripts. I have also included an embedded description of the data-flow in the current systems in the reports.

The Mucheke Public Library

The Mucheke Public Library is owned and run by the Municipality of Masvingo as a service to its ratepayers. It is run on a non-profit making basis and its activities are financed by the municipality and well wishers.

The library has a total of about 2 522 members and this number is expected to keep rising steadily. The library offers only three types of membership. The first type of membership known as temporary membership is for those who may wish to use the library's studying facilities for only one day and this scheme is quite popular around exam time. The second type of membership is called General Membership. This scheme is for those who wish to use the library's studying facilities regularly and the scheme is on an annual basis. About 90% of the 2 522 members are General members. Borrowers make up the other 10% and as their scheme's title implies, they are allowed to borrow books. The borrowers pay a general membership fee, a borrowing fee and a 'Caution' fee which is refundable on termination of membership provided that no books have been lost or damaged. The borrowing fee is paid only once at the onset or renewal of membership. The borrowers are allowed to borrow only one book at a time for a maximum of two weeks after which a fine of $1,50 per day is charged.

The library has over 17 500 books which fall into 3 categories namely Fiction, Non-fiction and Reference. The reference section is made up of books considered to be either too valuable or highly demanded to be loaned out. The library has no requisition system as the librarian feels that the system of putting books under high demand in the reference section is adequate.

The General Members and Borrowers are given library cards which are basically similar with the only difference being in the type of membership printed on the front of the card. Detailed records of all the subscription details considered relevant are kept in a file and these include

- Date on which membership commenced.
- Date on which the subscription expires.
- Card number.
- Receipt number.
- A home address which should be in Masvingo.

In addition to the above, the following records are kept about borrowers:

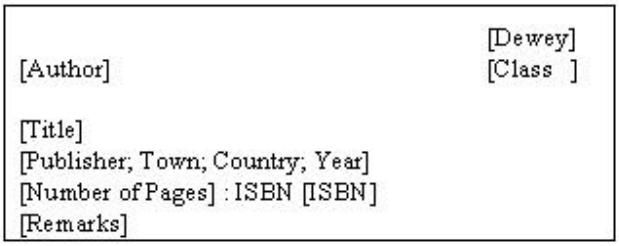
- National ID number
- Business or School address.
- Contact telephone numbers.

The borrowers are also required to submit proof of the details they will provided and to fill in a special form which is filed. Temporary members are given receipts as proof of payment and only the names and receipt numbers are taken down along with the date.

The cataloguing of books in the library is on a chronological basis and the records are kept in an accession book. The following details are kept about each book

- Unique accession number.
- Date registered
- Dewey decimal classification system number.
- Library class.
- Title
- Author
- Publisher and place of publication.
- Supplier
- Remark i.e. any notes.

In addition, each book has an identification card which acts as an independent record of the above details.



The library is audited at irregular intervals by the municipal internal auditors. During these audits, the records are checked against the books in the library with all discrepancies being noted down for clarification later. The librarian also prepares categorised totals of books and types of membership regularly for the municipal accountants along with lists of books which will have been overdue for a suspiciously long time.

The book loan system

When a book is borrowed, the librarian notes down the following

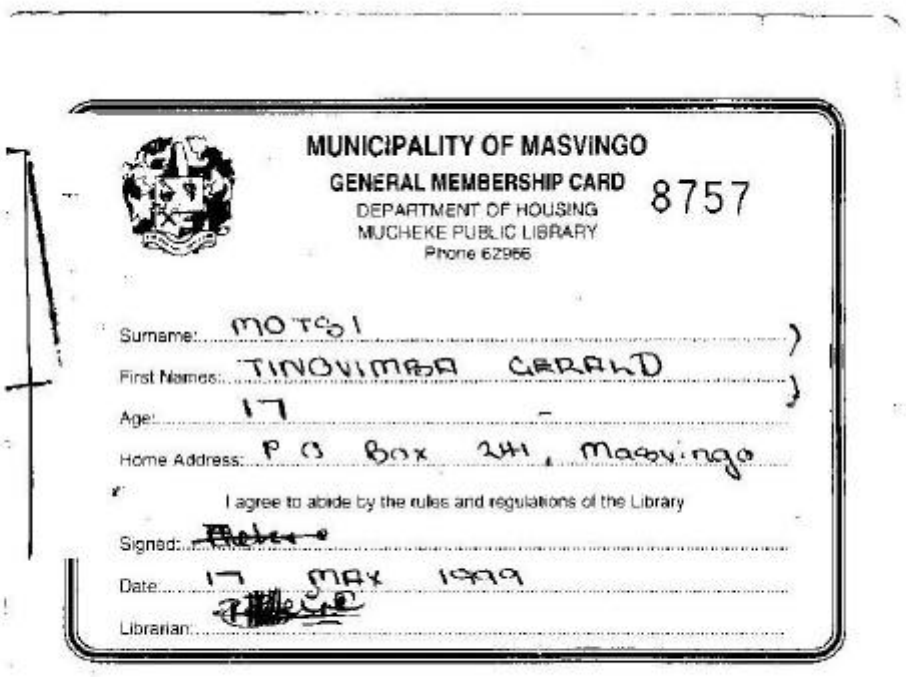
- The date.
- The borrowers card number.
- The book's accession number.
- The due date

The borrower then signs an acknowledgment of the receipt of the book. When the book is returned, the librarian signs against the loan record thus cancelling it and fines the borrower if the book is overdue.

Problems faced

1. Statistics collection is laborious and time consuming especially when the statistics are required on short notice.
2. During peak periods especially during holidays and just before exams, the workload on the librarians often becomes too large to manage resulting in errors.

Borrowers Card



MUNICIPALITY OF MASVINGO

GENERAL MEMBERSHIP CARD 8757

DEPARTMENT OF HOUSING

MUCHEKE PUBLIC LIBRARY

Phone 62966

Surname: MOTSI

First Names: TINOVIMBA GERALD

Age: 17

Home Address: P O Box 244, Masvingo

I agree to abide by the rules and regulations of the Library

Signed: [redacted]

Date: 17 MAY 1999

Librarian: [redacted]

Borrowers Form

MUNICIPALITY OF MASVINGO

MUCHEKE PUBLIC LIBRARY BOROWER'S FORM

PART A (TO BE FILLED BY APPLICANT)

FULL NAME.....

BUSINESS ADDRESS/SCHOOL...

BUSINESS TELEPHONE NUMBER.....

NATIONAL REGISTRATION NUMBER.....

DATE OF BIRTH.....

RESIDENTIAL ADDRESS.....

DECLARATION

I declare that the information I have given on this form is correct and complete in every particular. I accept full responsibility of any book I have borrowed from the library.

SIGNATURE..... DATE .....

PART B (TO BE COMPLETED BY PARENT(GUARDIAN)

I certify that the above information is correct and I accept full responsibility for any book borrowed from the library by my child.

I (FULL NAME).....(PLEASE PRINT)

NATIONAL REGISTRATION NO. .....

BUSINESS ADDRESS.....

BUSINESS TELEPHONE NO.....

RESIDENTIAL ADDRESS.....

TELEPHONE NO. .....

SIGNATURE..... DATE.....

FOR OFFICE USE ONLY

AMOUNT PAID ..... OFFICIAL DATE STAMP

RECEIPT NO.....

DATE .....

SIGNED .....

MUCHEKE PUBLIC LIBRARY
P.O. BOX MI
1999 -05- 17
CHIKATO
TEL. 62966

Interview Script

Are you part of any larger organisation?

YES ✓ NO

If you are then please specify:

Name of organisation: Municipality of Masvingo

Type: Municipality

2. Approximately how many books and subscribers do you have?

Books: 17 500

Subscribers: 2 522

3. Please specify the following about each category of the books you have:

Category Name	Loaned out (Y/N)	Borrowing Fee	Loan Period
1. Reference	N	—	—
2. Fiction	Y	—	2 weeks
3. Non Fiction	Y	—	2 weeks
4.			
5.			

4. If you offer more than one type of membership then please specify the following for each type where applicable.

Type	Categories Borrowed	Borrowing Fee	Loan Duration
1. Temporary	—	—	
2. Ordinary	—	—	
3. Borrower	2 & 3	—	
4.			
5.			

5 Do you allow your subscribers to request books which will be out so that they may be the first to borrow them when the are returned?

YES ☐ NO ☑

6 Please state how your borrowing limit is organised. If it includes category combinations then please include this in your explanation.

one book per person for a maximum loan period of 2 weeks

7. Please specify how you fine for overdue books.

$1,00 per day per book

8 What information about your subscribers do you keep?

Date of joining, subscription expiry, card no receipt number, home address for all. For the borrowers: ID no., business address, contact phone numbers

What records concerning your books do you keep?

Date obtained, accession number, classes no., Title, Author, Publisher name & place, Book source, remarks

10. Do you stock take?

YES ✓ NO

If you do then:
How often? irregular, surprise audits

What information do you collect?
comparing of book in the records and those in the library.

11. Do your members have library cards ?

YES ✓ NO

If they do, then what key details appear on these cards?
Name, card number, Age, Home address

Are you computer literate?

YES NO ✓

Intend to learn.

MUCHEKE PUBLIC LIBRARY
P.O. BOX MI
1999 -05- 17
CHIKATO
TEL. 62966

LIBRARY STAMP

Barnabas Beira

The Margaret Sharpe Library

The Margaret Sharpe Library was founded by Mrs Sharpe, the wife of the founder headmaster of Victoria High School. Its main aim is to promote wider reading in the school especially among the junior forms.

The library relies on the school for both operational funds and books. This support is supplemented by the various clubs in the school and well-wishers. On receiving a book, the librarian enters its details in the Accession Book and then proceeds to catalogue the book as to the library's cataloguing policy. After cataloguing the book, the librarian ticks the 'Catalogue' column of the book's record in the accession book and then proceeds to file the catalogue cards. At the present moment, the library has over 13 000 books.

Each book has a small envelope stuck to its back cover in which a small card is kept. When a book is borrowed, its card is taken out of its envelope and placed in the borrower's envelope and the due date stamped on the book's due date form. On returning the book, the card is simply replaced and if the book is overdue, the borrower is suspended for a period determined by the librarian at his own discretion.

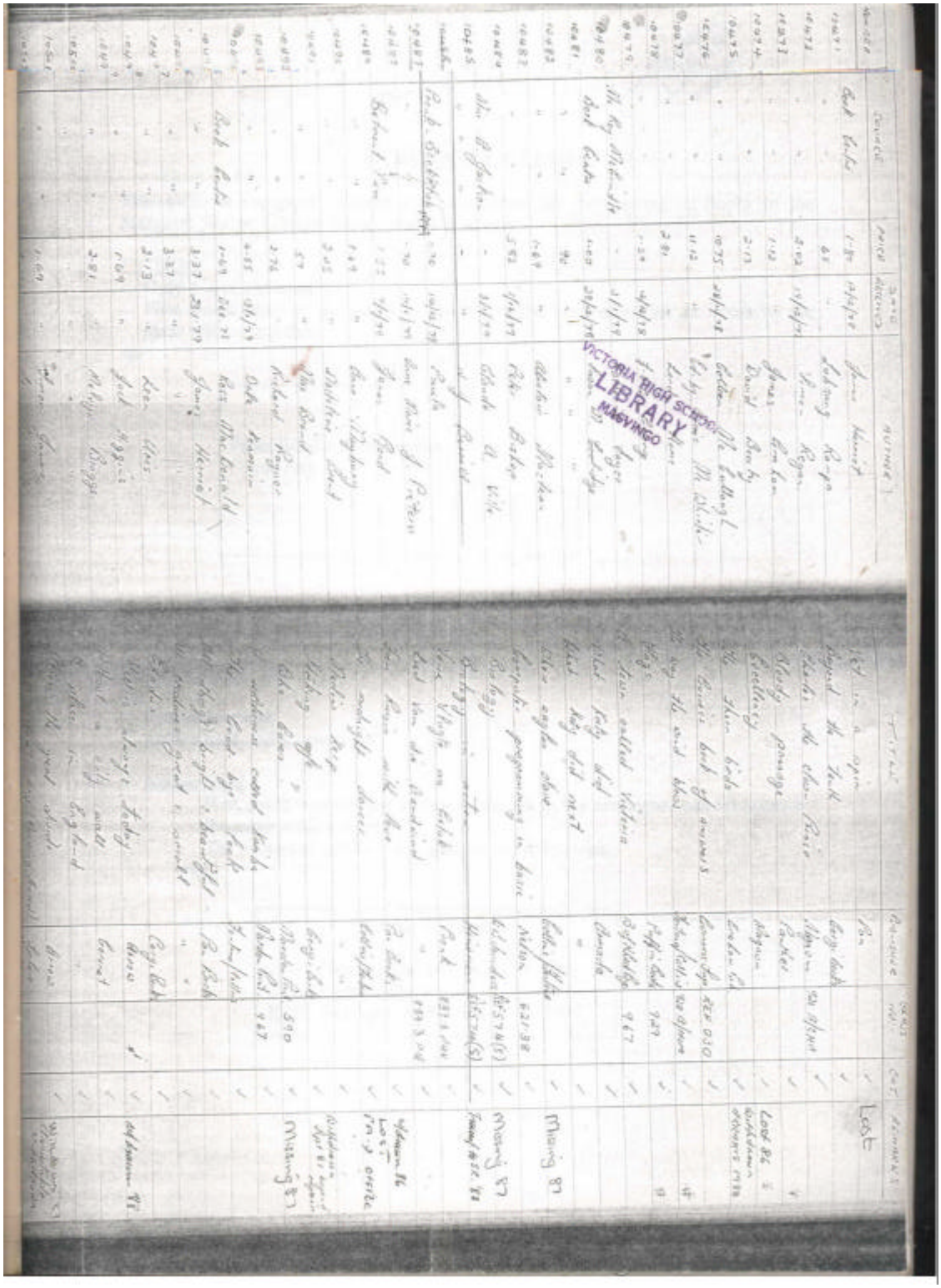
The books in the library fall into four categories namely Fiction, Non-fiction, Reference and Reserved. The fiction category is made up of all works of fiction excluding Classics and all works in languages other than English. Books considered too valuable to be loaned out like encyclopaedias are kept in the reference section whilst the reserve section is made up of new books which are also not loaned out. A pile of requested books is also kept on the librarian's table and these can be taken to form an informal fifth section. The requisition system is rather informal with a request being made by simply noting down the title of the book and the name of the person who will be requesting it. When the book is returned, the librarian ticks the entry and then cancels it when the book is borrowed or when he feels that the book has been on the request list for too long.

The two type of membership schemes offered by the library are quite similar with the only exception being in that teachers are allowed to take out more than one book at a time whilst students are restricted to only one. The library is audited once a year and during this audit, the records are checked against the actual books present in the library with all discrepancies being noted down in the remark column of the accession book. The librarian is also required to routinely compile lists of all the lost books or books which will have been out for a suspiciously long time for the clearing of students before they go home or collect their public examinations results. Various other statistics are also extracted regularly for the bursar.

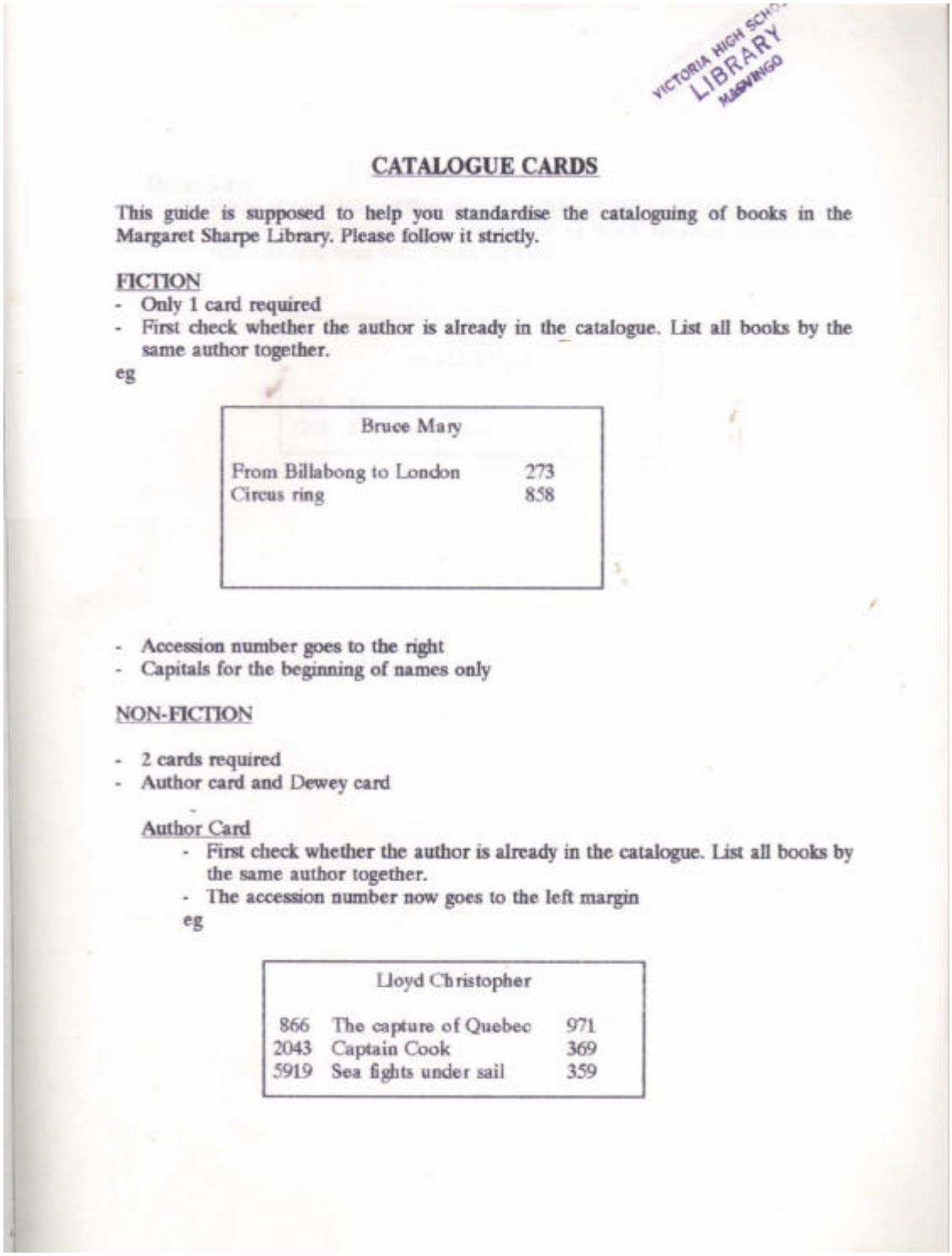
Problems Faced

1. The request system is extremely inefficient as the librarian will often not be able to check the list on busy days.
2. Records are not secure as the junior librarians often edit the records before the stock taking period so that their friends show no outstanding books during the Student Clearing period. As there is no record of transactions, the culprits are rarely caught.
3. Accessing the records of individual books even in their indexed form is a long and extremely tedious process. This is often necessary, as most students will often approach the librarian requesting a particular book without even knowing the proper title or the author's name.
4. Statistics compilation is slow, laborious and prone to an extremely high degree of error especially when under pressure from the School Administration.

Accession Book



Cataloguing Policy



CATALOGUE CARDS

This guide is supposed to help you standardise the cataloguing of books in the Margaret Sharpe Library. Please follow it strictly.

FICTION

- Only 1 card required
- First check whether the author is already in the catalogue. List all books by the same author together.

eg

Bruce Mary	
From Billabong to London	273
Circus ring	858

- Accession number goes to the right
- Capitals for the beginning of names only

NON-FICTION

- 2 cards required
- Author card and Dewey card

Author Card

- First check whether the author is already in the catalogue. List all books by the same author together.
- The accession number now goes to the left margin

eg

Lloyd Christopher		
866	The capture of Quebec	971
2043	Captain Cook	369
5919	Sea fights under sail	359

VICTORIA HIGH SCHOOL
LIBRARY
MASVINGO

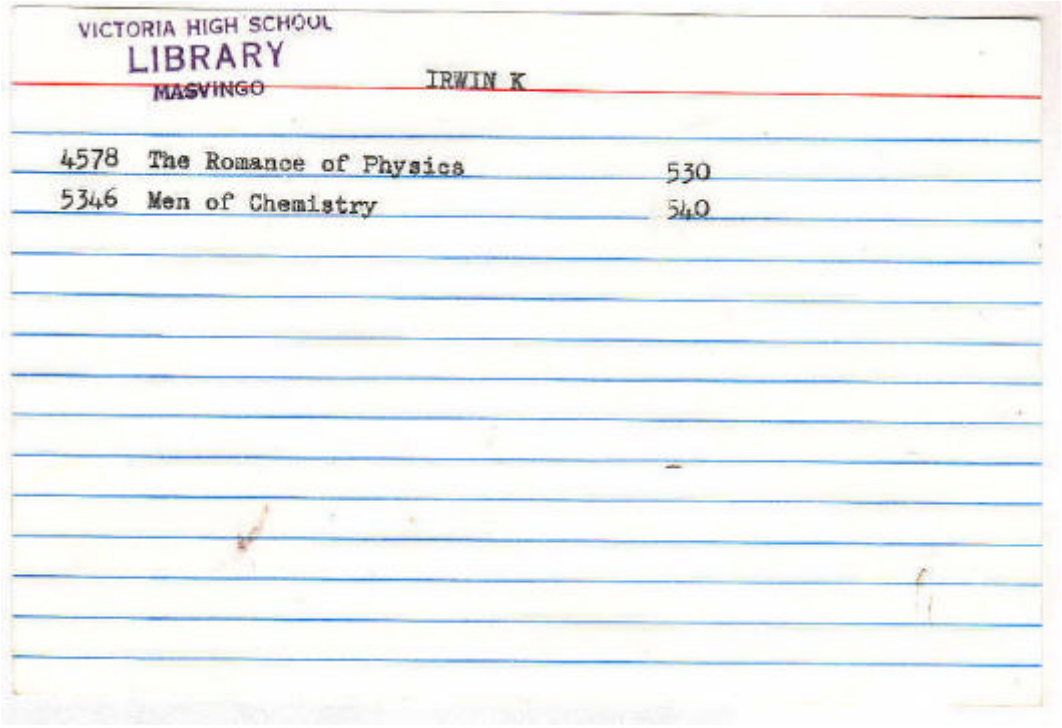
Dewey Card

- Every number has a different card eg 940 and 940,5 are listed separately
- Different authors are listed separately eg 940,5 Brandon Russell has a different card from 940,5 Bruckhill Paul.

eg

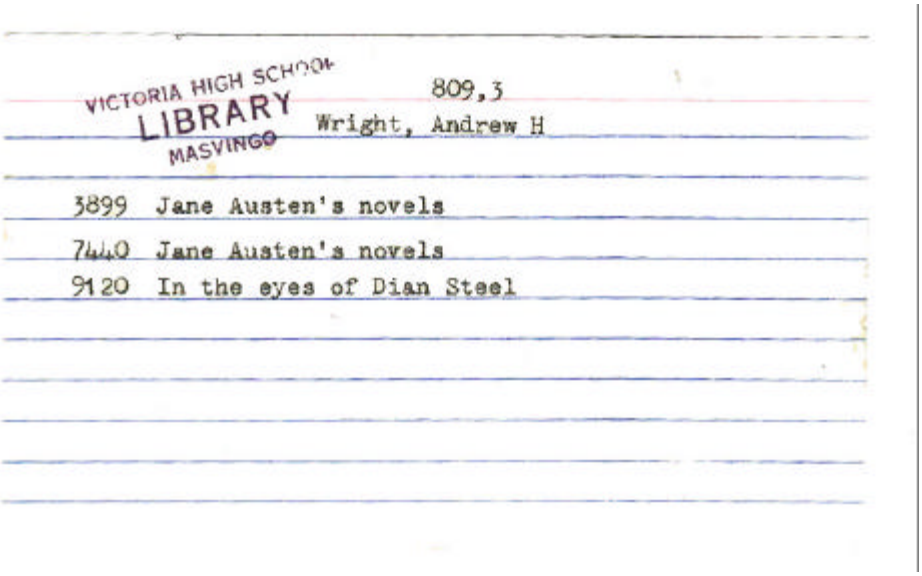
940.5
Bruckhill Paul
415 Escape to danger
2253 The dam busters

Catalogue Cards


VICTORIA HIGH SCHOOL
LIBRARY
MASVINGO

IRWIN K

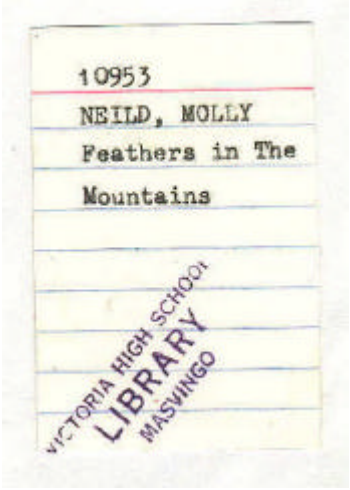
4578 The Romance of Physics 530
5346 Men of Chemistry 540


VICTORIA HIGH SCHOOL
LIBRARY
MASVINGO

809,3
Wright, Andrew H

3899 Jane Austen's novels
7440 Jane Austen's novels
9120 In the eyes of Dian Steel

Ones
SIB
VICTORIA HIGH SCHOOL
LIBRARY
MASVINGO
4A1 1999


10953
NEILD, MOLLY
Feathers in The
Mountains
VICTORIA HIGH SCHOOL
LIBRARY
MASVINGO

Interview Script

1. Are you part of any larger organisation?

   [✓ YES] [NO]

   If you are then please specify:
   Name of organisation Victoria High School
   Type Government School

2. Approximately how many books and subscribers do you have?
   Books 13 000
   Subscribers

3. Please specify the following about each category of the books you have:

Category Name	Loaned out (Y/N)	Borrowing Fee	Loan Period
1 FICTION	Y		7 days
2 NON-FICTION	Y		7 days
3 REFERENCE	N		N/A
4 RESERVED	N		N/A
5			

4. If you offer more than one type of membership then please specify the following for each type where applicable.

Type	Categories Borrowed	Borrowing Fee	Loan Duration
1. STUDENTS	1 & 2		1 BOOK/WEEK
2. TEACHERS	1 & 2		2 BOOKS/WEEK
3.			
4.			
5.			

5 Do you allow your subscribers to request books which will be out so that they may be the first to borrow them when the are returned?

YES ✓ NO

6 Please state how your borrowing limit is organised. If it includes category combinations the please include this in your explanation.

Members just borrow as to the borrowing limit for their types of membership

7 Please specify how you fine for overdue books.

2 days overdue = no fine
After one week you are given a temporary ban looking for the period equal to the time overdue.

8. What information about your subscribers do you keep?

Surname, First name, class, Year

9. What records concerning your books do you keep?

Number, source, price, date obtained, author, title, publisher, class number, cat, remarks

10. Do you stock take?

YES ✓ NO

If you do then:

How often? annual

What information do you collect?

books lost, overdue, missing and

wasted withdrawals.

11. Do your members have library cards ?

YES NO ✗

If they do, then what key details appear on these cards?

N/A

12. Are you computer literate?

YES ✓ NO

VICTORIA HIGH SCHOOL
LIBRARY
MASVINGO

The Civic Centre Library

The Civic Centre Library is a small library located next to the municipal offices in Masvingo. It is run by an independent committee not affiliated to any organisation.

The library offers only one type of membership that is subdivided into three slightly different schemes. The first scheme is for people over the age of 18 years, the second one is for people below the age of 18 years and the third scheme is for people living outside Masvingo. The only differences between the schemes are that the people below the age of 18 years need to have some sort of guardian approval and that the country members i.e. those living outside Masvingo, may keep their books for up to 1 month instead of the standard 2 weeks. Members currently pay a $50 annual subscription that entitles them to one book at a time for a maximum of 2 weeks. There is no limit on the number of times you may borrow books. Members also have an option of paying an extra annual payment of $25 per book per year if they wish to have their borrowing limit raised. There is also no theoretical limit to the number you can raise your borrowing limit to.

The books in the library fall into three main categories namely Fiction, Non-fiction, and Reference. All of the books in the library may be borrowed by all members save for those in the reference section. The fiction category is further subdivided into paperbacks and hardbacks. The books in the reference section are classified first as to the library classification system and then as to the Dewey Decimal Classification System.

Each member has an Account card and a borrowing pocket. The Account Card, shown below, contains a record of all the transactions involving subscription payments.

Masinire K. P. Bag 3076, Renco Mine
Country Member

Date	Transaction	Receipt
12/06/97	Subsc to 11/06/98	C270/97
05/06/98	Subsc to 11/06/99	E592/98
	Limit raise (1 * $25)	E593/98

The pocket is used as a record of the books currently loaned out to the member. Each book also has

- a title card
- an author card
- a borrowing card
- and an entry in the accession book

The entry in the accession book contains

- the accession number
- title
- author
- date of accession
- class

When a book is borrowed, its card is taken out of its pocket which will be on the back cover of the book, and placed in the member's pocket. The book's due date form is then stamped and at the end of the day all the pockets of those who will have borrowed books are taken and placed in a tray with the due date stuck on its front panel. After a due date has elapsed, all the pockets still in the tray are taken and placed in another tray for overdue books and expired subscriptions. When a book is returned, the process is simply reversed by returning the card and the pocket to their original locations. If a book is overdue, the member is fined 50 cents per book per week.

At the end of the month, the librarian compiles a list of suspiciously overdue books and expired subscriptions. She then proceeds to write each one of the affected people a letter asking them to return the overdue books or pay their subscriptions. The librarians also periodically checks the popularity of books and all those found to be under high demand are transferred to the reference section. Also, if she feels that a particular book is unpopular she may put it up for sale.

Problems faced

1. The librarian's main complaint was to do with the extraction of information from the system with particular references to the month end collection of data and preparation of letters. She believes that although the general management of data will probably remain satisfactory for quite some time, the statistics collection and end of month mailings area is going to worsen with time.
2. She also raised concerns on the requisition system which she has decided not to formalise because of the complexities that would be introduced.
3. The librarian believes that the current system major weakness is in its ability to assimilate change with special reference to the requisition system.

Interview Script

1. Are you part of any larger organisation?

YES [ ] NO [X]

If you are then please specify:
Name of organisation .....
Type .....

2. Approximately how many books and subscribers do you have?
Books 3 000
Subscribers 200 Adults 200 Children

3. Please specify the following about each category of the books you have:

Category Name	Loaned out (Y/N)	Borrowing Fee	Loan Period
1 REFERENCE	N		
2 FICTION			
3 NON-FICTION			
4			
5			

4. If you offer more than one type of membership then please specify the following for each type where applicable.

Type	Categories Borrowed	Borrowing Fee	Loan Duration
1. Adult	2 on 3	$50 / year	2 weeks
2. Children	2 and 3	$50/year	2 weeks
3. Corporate Members	2 and 3	$50 / year	1 month
4.			
5.			

5 Do you allow your subscribers to request books which will be out so that they may be the first to borrow them when the are returned?

YES ☑ NO ☐

6 Please state how your borrowing limit is organised. If it includes category combinations the please include this in your explanation.

A member is enbibled to one book per week. If the member to have her borrowing limit increased she will pay an extra $250 per year per book

7. Please specify how you fine for overdue books.

50c per book per week.

8. What information about your subscribers do you keep?

Name, address, borrowing limit and accounts which contain the debits or each transaction.

9. What records concerning your books do you keep?

Title, author, number, class

10. Do you stock take?

YES ☑ NO ☐

If you do then:

How often? once a month

What information do you collect?

overdue books and expired subscriptions information used in sending letters to the affected subscribers

11. Do your members have library cards ?

YES ☐ NO ☑

If they do, then what key details appear on these cards?

12. Are you computer literate?

YES ☐ NO ☑

Checked and correct.

L. Q John

LIBRARY STAMP

The Mkwasine Country Club Library

The Mkwasine Country Club is located in Mkwasine Estate about 38 kilometres from Chiredzi in the Low-veld. The club is the major provider of entertainment services to the residents of Mkwasine Estate and the surrounding areas. It is made up of a sports unit, a children play centre, a catering department and a library.

The library only has fictional books obtained through donations from club members and Mkwasine Estate. The books are kept for as long they are regarded popular. Once a book goes for a long time without being borrowed it is put up for sale. Each member of the club has a membership card that is used for identification purposes throughout all the departments of the club including the library. Although one needs to be a member of the club before becoming a member of the library, being a member of the club does not automatically make one a member of the library. Subscribers to the library are charged a joining fee, a monthly subscription and a borrowing fee for each book borrowed. At the present moment, a subscriber is allowed to borrow a maximum of 5 books at a time with each book being kept for a maximum of 2 weeks. Where the end of the 2-week period falls on a public holiday, the loan period is extended to the day after the public holiday.

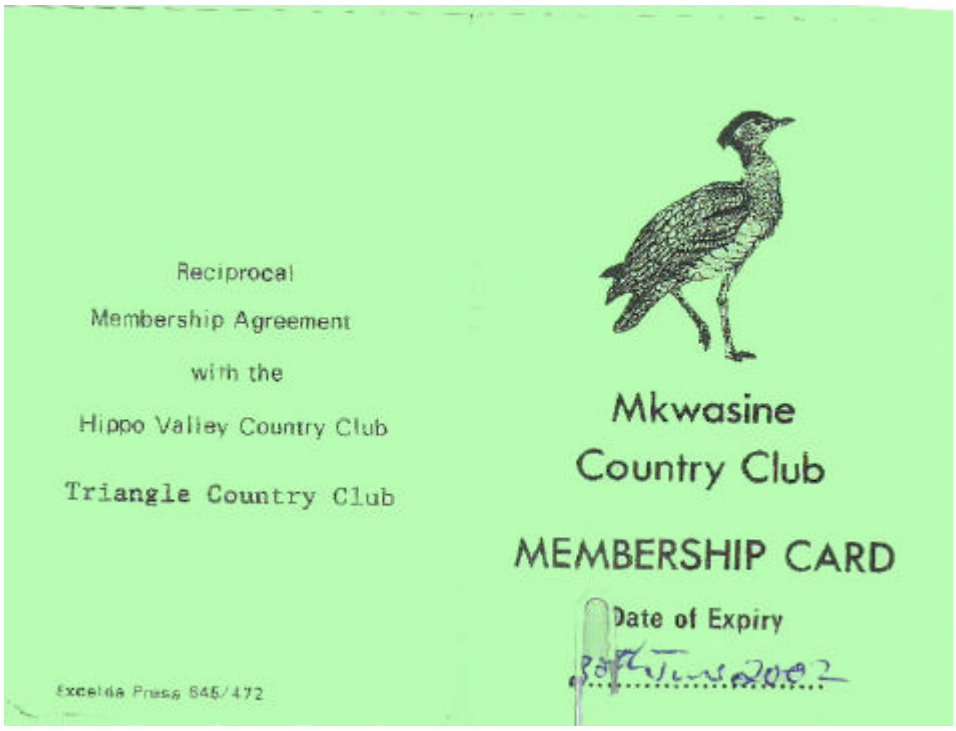
Records of the subscription details along with the date on which the subscription expires and the books loaned out to the subscriber are all kept on a single sheet of paper in a file containing the details of all the subscribers. Once the sheet is full or the subscription has been terminated, the sheet is moved to another file for achieving. Records of the books are also kept for cross-referencing purposes. In order to ensure that due dates are observed by the subscribers, a fine is charged for each day a book is kept after the due date. If a book is lost or returned in a very bad condition, the subscriber is fined an amount equal to the cost of replacing the book or alternatively the subscriber may simply obtain a replacement for the library.

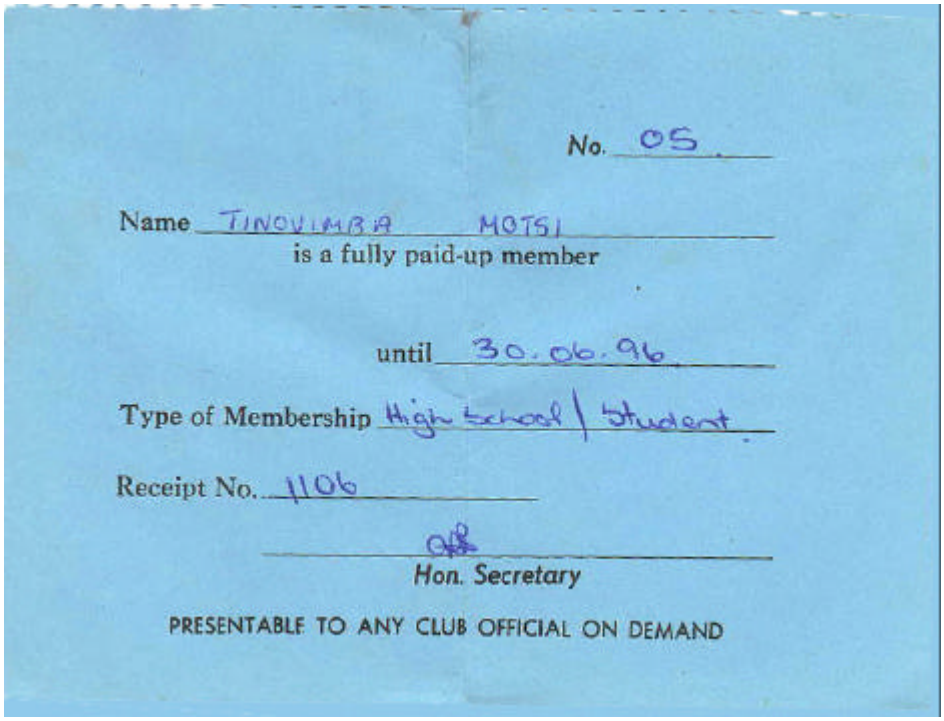
At the end of the year all the books are returned for stocktaking and inspection and all those not returned are considered lost and the subscribers responsible fined. The proceeds from the library are used in improving the services provided by the club.

Problems Faced

The Mkwasine Country Club has of late been facing some severe data management problems. Its traditional record management system which was viewed as being satisfactory only a few years ago has now collapsed. Most of the records are still there but then their unreasonably large quantity has made it virtually impossible to extract any useful information from them. The library however is still running and the only thing which probably saved it was the sharp decline in the number of subscribers which accompanied the opening of a Video Club. In an effort to alleviate the above mentioned problems, the library has downsized its data management to records of the books borrowed and subscription payments. It is however my opinion that the system can still be saved since most of the records are still available.

Membership Cards





Generalised Evaluation

The following is an evaluation of all the systems put together taking into account all their strengths and weaknesses.

Advantages

- ✓ The systems are accepted by those who use them and recognised as important symbols of tradition.
- ✓ The users of the systems fully understand them and they know what to do when things go wrong.
- ✓ The systems are relatively inexpensive as far as running costs are concerned with most of the inputs being obtained at low costs either from established suppliers or donors.

Disadvantages

- ✘ The systems were designed to, handle relatively small amounts of data making it difficult for them to deal with the increase in the volume of data especially in the area of data analysis and statistics compilation.
- ✘ The systems cannot efficiently handle the stress brought onto them during peak periods like holidays and exam time leading to delays and errors.
- ✘ The systems are rigid making it very difficult to introduce anything new without having to first make an unreasonably large amount of changes to the existing system.

Comment on Evaluation

When the advantages and disadvantages are weighed against one another it becomes evident that the disadvantages are not only long term but also that they are likely to worsen with time. On the other hand, given time, the advantages need not be sacrificed as they can be cultured into a new system. A change in the system is therefore advisable.

Alternatives to Computerisation

Worker Increase

This alternative is based on an assumption that having more librarians will distribute the workload relatively equitably over the then many librarians thus reducing the individual workload to a manageable level. However, further analysis reveals that although this applies in a theoretical world, it is not practical. Firstly, an increase in the number of librarians would also mean paying out more salaries and wages and given the funding structure of the libraries, any long-term recurrent expenditure is not feasible. Secondly, people tend to have relatively similar preferences with regards to service deliverers. This implies that the individual most liked would be swamped when on duty whilst the other librarians would be avoided. Finally, yet importantly, having more librarians would reduce the level of accountability that is a bare necessity in all accuracy sensitive systems. This lack of accountability would significantly reduce the pressure to perform reasonably and thus lead to more errors in the system.

Information Reorganisation

This alternative is based on the assumption that the information in the library is not satisfactorily organised thus providing an opportunity to increase efficiency by simply reorganising the way the information is structured. Whilst it is evident that the organisation of the information has become far from optimum over the last couple of years, reorganising it without tackling the causes of this state would only result in a short-term solution. It therefore follows that although information reorganisation should be an important component of any solution it cannot be viewed as satisfactory on its own.

Conclusion

Given the above arguments, it is the opinion of this author that the above mentioned alternatives seek to only deal with the symptoms without addressing the root causes of the problem. Computerisation will therefore be adopted and implemented as the solution to the above problem.

Specific Objectives

Given the above deliberations, it is now possible to define the specific targets that should be met by any future system. The system should

- ☞ Facilitate the management of book and subscriber records with particular reference to
  - Registering new books and subscriptions.
  - Editing and deregistering these records.
  - Allocating different rights to different members.
  - Allocating different loan properties to different books.
- ☞ Facilitate the borrowing, returning and requisition of books through a user friendly interface with particular reference to the following
  - Automatically maintaining a list of books on loan and requisition.
  - Working behind the scenes to detect possible errors by validating the entries made.
  - Presenting the details of subscribers requesting the loans or requisitions and the books concerned for verification processes.
- ☞ Be capable of maintaining a large database with particular reference to
  - An optimised organisation of data.
  - Backup and file restoration facilities.
  - Logical troubleshooting.
- ☞ Facilitate the extraction of statistics and their use in the automatic preparation of reports.
- ☞ Enable wide database querying with the results produced being stored in a format that would facilitate their use in mail merging and report preparation.
- ☞ Keep a log of all the transactions and a record of the librarians who will have committed them.
- ☞ Be capable of giving different users different levels of access.
- ☞ Store most of the environmental features in a set-up file and provide a utility for managing this file so as to facilitate easy policy changing. This file should be encrypted for security reasons.

DESIGN

Introduction

I intend to adopt a Top-Down structured design. At the first level, I have divided the design into 3 stages namely

- Database design
- Modulation
- Module design

The database design stage will primarily involve the identification and grouping of data items into tables and databases. It will be followed by the modulation stage that will involve the splitting of the system into task specific modules. The final stage that I have decided to call Module design, will involve the design of each module identified during the modulation stage with particular attention being paid to interface, input and output design.

After designing the solution, I will then proceed to code each module in either Turbo Pascal 6.0 or Visual Basic. Each of the modules will then be subjected to the first stage of testing to ensure that all of the specific objectives will have been met. A more comprehensive test plan will be decided upon after I have come to grips with the demands of the design which I believe are still not yet clear but the plan will focus on ensuring that all modules work as to specifications and that the objectives have been met.

Choice of Programming Language

Given the specific objectives and a choice between Visual Basic and Turbo Pascal, I am of the opinion that the solution would be best implemented in Visual Basic because of the following reasons:

1. Visual Basic's database management facilities, with particular reference to the Visual Basic Jet Engine, make it suitable for the development of systems that handle large amounts of data like library systems.
2. Visual Basic's windows based Graphical User Interface development toolkit gives it a definite edge over Turbo Pascal's manual drawing methods in the development of user friendly interfaces especially in situations like this one where there is a severe time constraint.
3. Visual Basic has an embedded Standard Query Language facility that would ease the achievement of the specific objective on wide database querying.
4. Windows dominance in the PC Operating System market implies a significant reduction in training costs for those applications developed for novice users as the users would already be familiar with the Windows environment.

Database Design

Identification of data items

I have decided to categorise the data items that will need to be kept as to the various tasks likely to be performed by a standard library. These tasks include

- Maintenance of book and subscriber records
- Loaning and returning books
- Making and processing requisitions
- Maintenance of data that defines the system
- Maintenance of a record of all transactions committed to the system.

Books Records

Each book record we will need to maintain the following

- A unique book number
- Date registered
- Title
- Author
- International Standard Book Number (ISBN)
- Dewey Decimal Classification System Number
- Its class as to the library's classification system
- Publisher and place of publication
- Where the book was obtained i.e. Supplier
- Borrowing fee if books are loaned out at different fees
- Loan period if the loan period varies from one book to another
- A note as to whether the book can be loaned out or not.
- Any additional notes.

In addition to the above, when a book is de-registered the following info which also need to be noted down

- Date deregistered
- Standard reason
- Any additional deregistration notes

Subscription Records

The following subscription details will need to be maintained

- A unique library identification number
- The full name of the subscriber i.e. Title, Initials, and Surname
- A note for additional identification purposes e.g. National ID or Passport number
- The date on which the subscription commenced
- The day on which the subscription expires
- The subscriber's borrowing limit if borrowing limits vary from one subscription to another
- The subscriber's borrowing fee if borrowing fees vary from one subscription class to another
- The subscriber's loan duration if the loan duration varies from one subscription to another
- Home address and phone number
- Contact address and phone number
- Any additional notes

When the subscription is terminated, the following details will need to be added

- Date deregistered
- Reason for deregistration
- Any additional deregistration notes

Book loans

For each book loaned out, the following details will need to noted down

- The date on which the book is loaned out
- The unique identification number of the book borrowed
- The unique identification code of the borrower
- The date on which it will be due
- The borrowing fee paid if any

When the book is returned, the following details will have to be noted down

- The date on which it is returned
- The day on which it was due
- The fine paid if any

If the loan period is extended or reduced for whatever reason then the following details will need to be noted down

- The date on which it is adjusted
- The new due date
- The period by which the loan period has been adjusted by

If the loan should be cancelled manually, i.e. not a normal return, then the following details will need to be noted down

- The date on which it is deleted
- The date on which it was due

In all the above transactions, the loan affected will be identified by noting down the book and subscriber concerned.

Requisitions

Concerning the making of new requests, the extension of requisition expiry date and the deletion of requisitions, the data will be modelled along the lines of the loan data. The only difference is that no fines or fees will be recorded as it is assumed that the requisition service will be offered free of charge. However the treatment of a requisition record when the person who will have made it borrows the book needs special treatment and when this does occur the following details will need to be noted down before automatically deleting the requisition entry:

- The date on which the book is borrowed
- The requisition's expiry date
- The book and subscriber concerned

System Identity

As to the specific objectives, the system will maintain an editable file defining its specifications that will reflect the library's various policies. The following details will be kept for this purpose

- ☞ The format of the subscription identification codes i.e. the combination of letters and digits. This will be maintained for validation purposes.
- ☞ How the borrowing fee per book is determined that is, whether it
  - is fixed
  - varies from book to book
  - varies from subscriber to subscriber
  - depends on both the subscriber and the book concerned
- ☞ The fine per book per day
- ☞ How the borrowing limit is determined i.e. whether it
  - is fixed
  - varies from subscriber to subscriber
  - is calculated as the fixed limit lest the number of books requested
  - is calculated as the subscriber's personal limit less the number of books requested
- ☞ How the requisition limit is determined i.e. whether it
  - is fixed
  - is calculated as the fixed limit less the number of books borrowed
- ☞ How the loan duration is determined i.e. whether it
  - is fixed
  - varies from subscriber to subscriber
  - varies from book to book
  - is calculated as the sum of the subscriber's and book's loan duration
- ☞ duration of validity of requisitions calculated from the date on which the book will be due
- ☞ how dates should be formatted
- ☞ the paths of the databases
- ☞ the name, password and level of a access for each user

Security

In the interest of system security and increasing accountability, the system will also, maintain a log of the users containing the following

- The time during which the user was using the system
- The user's name
- The part of the system accessed
- A unique session identification number for later reference.

The Grouping of Data Items

I have decided to group the identified data items into the following tables

Table Name	**Data contained**
Setup table	System identity
Main transaction log	Record of transactions involving loans and requisitions
Books transaction log	Record of transactions involving the registration and deregistration of books along with any changes made to book records
Subscriptions transaction log	Record of transactions involving the maintenance of subscriber records
Subscribers table	Details of all valid subscriptions
Books table	Details of all the books in the library
Books deregistered table	Details of all deregistered books
Terminated subscriptions table	Details of all subscriptions which will have been terminated
User log	Record of system use
Books borrowed	Details of all books out on loan
Books requested	Details of all books requested

Table Design

Storing Durations

Durations in the tables will be stored using the following format

xxMyyD where : M - Months : D - Days **: xx** is a 2 digit number between 00 and 12 inclusive **: yy** is a 2 digit number between 00 and 31 inclusive

Setup Table

The Setup table will be made up of two columns with the first column containing 30 character strings identifying the contents of each record. The second column will be made up of the variable defining the system element stated in the first column. For example, a row may appear as follows

Fine per book per day	525

Visual Basic's data manager maintains only one data type per column so I have decided to adopt the String data type for the second column. Each column will be 30 Characters long. The variables will be converted to into their proper data types during use. The table will be encrypted to discourage direct editing which may jeopardise the integrity of the data held. The variables will be stored as follows

Identifier	**Storage format & Possible values for the variable**
Subscriber ID format	8 character string with each of the characters being either an **L** or a **D** representing a letter or digit respectively. The string will be copied into an 8*1 array on loading . This property will be read only after setting up the database.
Books charged as to	An integer between 1 & 4 inclusive 1-Fixed 2-Membership scheme 3-Type of book 4-Book + Membership
Fixed book charge	An integral amount in cents between 0 and 32767 inclusive. The 32767 barrier is imposed as the limit for integers in VB

Fine per day		An integral amount in cents between 0 and 32767 inclusive.
Borrowing limit as to		An integer between 1 and 4 inclusive 1-Fixed 2-Membership scheme 3-Fixed *less* Number requested 4- Membership scheme - Number requested
Fixed borrowing limit		An integral amount between 0 and 20 inclusive
Requisition limit as to		An integer between 1 and 2 inclusive 1-Fixed 2-Fixed *less* Number borrowed
Fixed requisition limit		An integral amount between 0 and 20 inclusive
Loan duration as to		An integer between 1 & 4 inclusive 1-Fixed 2-Membership scheme 3-Type of book 4-Book + Membership
Fixed loan duration		Standard loan duration format
Requisition valid for		As above: Fixed loan duration
User 1	Name	30 character string
	Password	30 character string
User 2	Name	30 character string
	Password	30 character string
	Level of a access	A binary string where each bit represents the access rights of the user to a specific area. If the bit is 1 then access will be granted but if it is 0, access will be denied. For example if there are 5 areas A, B, C, D & E and the string is 10010 then the user will only have access to areas A & D.
User 3	Same as for User 2	Same as for User 2
Date format		A valid VB date formatting string

Main Transaction Log Table

After analysing the data which I had identified as needing to be stored with each loan or requisition related transaction, I discovered that all the transactions dealt with the following

- the date on which the transaction occurred
- the book number of the book concerned
- the subscriber concerned
- an amount which will either be a fee, a fine or a number of days
- an extra date which will either be a due or expiry date

I have decided to adopt the above as the columns of the main transaction log table. I have also decided to include a sixth column which will indicate the type of transaction stored in a record. The following is the numbering system to be used for this purpose

Type of Transaction	**Number Used**
Borrowing	10
Extending loan due date	11
Returning a book	20
Deleting a loan manually	21
Making a requisition	30
Processing a request (Book borrowed)	31
Extending a requisition expiry date	32
Deleting a request manually	33

The data type structure of the table will be as follows

Column	**Data type**	**Size**
Date	Date	
Subscriber ID	Text	8 characters
Type	Integer	
Book number	Long integer	
Amount	Currency	
Extra date	Date	

The columns will be used as follows

Date	**Type**	**Subscriber ID**	**Book number**	**Extra date**	**Amount**
	10	ID	ID	Due date	Borrowing fee
	11	ID	ID	New due date	Days extended by
	20	ID	ID	Date due	Fine if any
	21	ID	ID	Date due	
	30	ID	ID	Expiry date	
	31	ID	ID	Expiry date	
	32	ID	ID	New expiry date	Days extended by
	33	ID	ID	Expiry date	

Book records transaction log

Column	Data type	Size	Comments
Date	Date		
Book number	Long integer		
Date registered	Date		
Type	Integer		1-Register new book 2-Edit existing record 3-Deregister book
Book title	Text	25 characters	
Book author	Text	20 characters	
Borrowing fee	Integer		Amount in cents
Loan period	Text	6 characters	Duration format
Loanable	Boolean		
Publisher	Text	25 characters	
Supplier	Text	20 characters	
Dewey	Text	15 characters	
Class	Text	10 characters	
ISBN	Text	20 characters	
Reason	Text	30 characters	
Remark	Text	30 characters	
Edited	Text	12 characters	A binary string for the columns in the order • Book title • Book author • Date registered • Borrowing fee • Loan period • Loanable • Class • Dewey • ISBN • Publisher • Supplier • Remark

During deregistration, the columns will be used as follows

Column name	Data Stored
Date	Date registered
Book number	Book number of book deregistered
Reason	Standard reason for deregistration
Remark	Deregistration remark

All the other columns in the transaction log will be left blank.

Subscriber Transaction Log

Column	Data type	Size	Comments
Date	Date		
Type	Integer		1-Register new subscription 2-Edit existing record 3-Terminate subscription
Subscriber ID	Text	8 characters	
Registered On	Date		
Expiry date	Date		
Surname	Text	15 characters	
Initials	Text	4 characters	
Subscriber Title	Text	4 characters	
National ID	Text	20 characters	
Borrowing fee	Integer		
Borrowing limit	Integer		
Loan period	Text	6 characters	Duration format
Home Address	Text	60 characters	
Home phone number	Text	12 characters	
Contact Address	Text	60 characters	
Contact phone number	Text	12 characters	
Remark	Text	30 characters	
Reason	Text	30 characters	
Edited	Text	14 characters	National ID Surname Initials Subscriber Title Registered on Expiry Date Remark Enter Borrowing fee Borrowing limit Enter Loan period Home address Home phone number Contact address Contact phone number Reason

During deregistration, the columns will be used as follows

Column name	Data Stored
Date	Date registered
Subscriber ID	Subscriber ID of book deregistered
Reason	Standard reason for termination
Remark	Termination remark

All the other columns in the transaction log will be left blank.

Books table

Column	Data type	Size	Comments
Book number	Long integer		
Date registered	Date		
Book title	Text	25 characters	
Book author	Text	20 characters	
Borrowing fee	Integer		Amount in cents
Loan period	Text	6 characters	Duration format
Loanable	Boolean		
Publisher	Text	25 characters	
Supplier	Text	20 characters	
Dewey	Text	15 characters	
Class	Text	10 characters	
ISBN	Text	20 characters	
Remark	Text	30 characters	

Deregistered books table

This table will contain in addition to all the columns in the Books table the following

Column	Data type	Size	Comments
Deregistered	Date		Date deregistered
Cancellation remark	Text	30 characters	
Reason	Text	30 characters	

Subscriptions Table

Column	Data type	Size	Comments
Subscriber ID	Text	8 characters	
Registered On	Date		
Expiry date	Date		
Surname	Text	15 characters	
Initials	Text	4 characters	
Subscriber Title	Text	4 characters	
National ID	Text	20 characters	
Borrowing fee	Integer		
Borrowing limit	Integer		
Loan period	Text	6 characters	
Home Address	Text	60 characters	
Home phone number	Text	12 characters	
Contact Address	Text	60 characters	
Contact phone number	Text	12 characters	
Remark	Text	30 characters	

Terminated Subscriptions Table

This table will contain in addition to all the columns in the subscriptions table the following

Column	Data type	Size	Comments
Deregistered	Date		Date deregistered
Cancellation remark	Text	30 characters	
Reason	Text	30 characters	

User log table

Column	Type	Size	Comments
Time in	Date		Date & time
User name	Text	30 characters	
Area	Integer		Area codes to be determined after modulation.
Session	Long integer		Unique session identification code automatically entered by VB
Time out	Date		Date & time

Books Borrowed Table

Column	Type	Size
Date borrowed	Date	
Subscriber ID	Text	8 characters
Book number	Long integer	
Date due	Date	

Books Requested Table

Column	Type	Size
Date requested	Date	
Subscriber ID	Text	8 characters
Book number	Long integer	
Expiry date	Date	

Modulation

Introduction

I have decided to adopt the following categories as the basis of my modulation exercise

- File management
- Loan and Requisition handling
- System configuration
- Search Utilities
- Report writing
- Security management
- Database management

File management

The file management section of the system will be made up of 8 modules, each dealing with one of the following areas

- Current subscriptions
- Books in the library and in circulation
- Terminated subscriptions
- Deregistered books
- Main transaction log
- Subscriptions transaction log
- Books transaction log
- Users transaction log

I have also decided to place the modules which deal with transaction logs in their own Project. This will go a long way towards making the main project more efficient as it will be smaller and thus requiring less memory.

Loan and Requisition handling

This section will be made up of 3 modules with each handling one of the following

- Borrowing
- Returning
- Requisition making

System configuration

This section will be made of the following

- A program for installing the system
- A program for initialising the database straight after installation
- A module for setting the system configuration

Search Utilities

I intend to provide search facilities at two levels i.e.

- A simple search utility for finding simple subscription and book data.
- A Standard Query Language (SQL) based search utility for in-depth analysis of the database

The simple search utility will become part of the main program and will contain 2 modules each dealing with one of the following

- Specifying the search criteria
- Showing the search results

The SQL based utility will form a separate project and will also be made up of 2 modules each dealing with one of the following

- Entering the SQL and executing it
- Showing the query results

Report writing

The Report writing utility will form its own Project and it will contain text editing, report writing and mail merge facilities. The modules will be as follows

☞ General
- A menu module which will also contain general text editing facilities for fonts, printing, opening & saving documents and inserting text.
- A module which will enable the user to specify what he wants to do
- Compiling SQL statements which will form the basis of the reports and mail merge activities

☞ Text editing
- Finding text
- Search and replace

☞ Mail merge
- Inserting merge fields
- Compiling standard letters and printing out the personalised letters

☞ Report writing
- A module for specifying report fields
- A module for specifying field widths

Security management

This section will also form its own project and it will focus on user access rights and data encryption. It will be made up of 3 modules each carrying out one of the following tasks

- Specifying user access rights
- Enforcing the specified access rights.
- A form for entering the access password

The password and access rights enforcing modules will be shared by the whole system.

Database management

This section will be made up of 4 modules each one making up an executable file of its own. The modules will each deal with one of the following

- Backup
- Recovery
- Repair and Optimisation

The optimisation and repair module will use the Visual Basic database optimisation and repair methods to carry out their tasks.

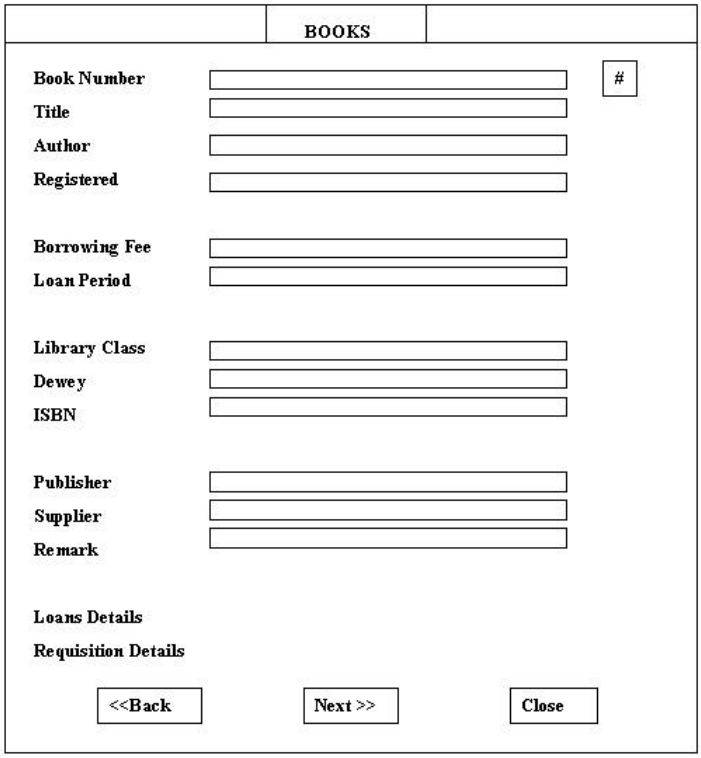
File Management

Books Records Management

Plan

The plan is to have a simple form displaying one record at a time. To avoid crowding, details concerning loans and requisitions will be displayed on another form accessible from the main books details form. The form should also be capable of sorting the records as to all the indexes in the books table and performing searches on these indexes. It should also facilitate the exporting of the displayed record to a text file or to the printer.

Input Form



Algorithms as to Task

Form Loading
Raise the loading flag

Form Activate
If the loading flag is up
    Lower the loading flag
    Set the default sorting index to the Book number index
    If the table is empty
        Alert the user of the empty books table and dim all the record manipulating controls
    Else
        Display the first record in the table
    End if
End if

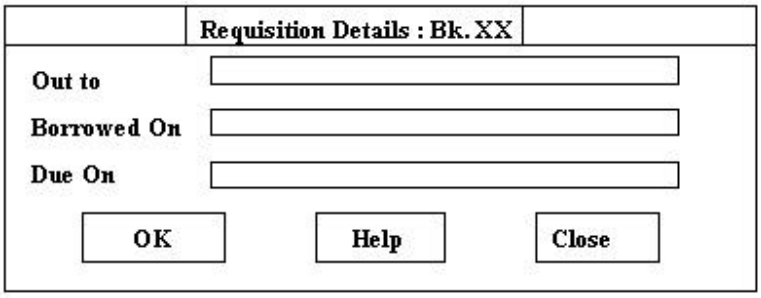
Display Record Routine
If the books table is empty
    Alert the user of the empty books table and dim all the record manipulating controls
    Clear all the text boxes
Else
    Enable all the record manipulation controls
    Enter the field data into the text boxes
    If the book is on loan then enable the loan data form link
    If the book is on request then enable the requisition data form link
    If the current record is the last record then dim the next button
    If the current record is the first record then dim the previous button
End if

Next Button
If the books table is empty
    Alert the user of the empty books table and dim all the record manipulating controls
    Clear all the text boxes
Else
    Move to the next record
    Ensure that the current record is not the End Of File marker
    Call the Display record routine
End if

Previous Button
If the books table is empty
Alert the user of the empty books table and dim all the record manipulating controls
Clear all the text boxes
Else
Move to the previous record
Ensure that the current record is not the Beginning Of File marker
Call the Display record routine
End if

Close button
Unload the books form

Requisition data label clicked
Search for the requisition entry
Load the display Loan and Requisition data form



Customise the forms labels to reflect a requisition entry
Enter the Book number in the caption of the form
Enter the full name of the subscriber who made the requisition in the Name text box
Enter the date on which the requisition was made
Enter the date on which the requisition expires
Display the form

Loan data label clicked
Search for the loan entry
Load the Display Loan and Requisition data form
Customise the forms labels to reflect a loan entry
Enter the Book number in the caption of the form
Enter the full name of the subscriber who borrowed the book in the Name text box
Enter the date on which the loan was made
Enter the date on which the due date
Display the form

Menu : New
If the books table is not empty then Mark the record displayed
Disable the Read only mode
Clear all the text boxes
Allow access to the Book number text box
Specify in the save button's tag property that the system is Engaging in a New data operation

Read Only mode handling
If enabling the read only mode
    Show the Next, Previous and Close buttons
    Hide the Save, Help and Cancel button
    Disable access to the Find free number and Insert today's date command buttons
Disable the editing capability of all the text boxes and the Loanable check box
    Allow access to the form's menu
Else
    Hide the Next, Previous and Close buttons
    Show the Save, Help and Cancel button
    Enable access to the Find free number and Insert today's date command buttons
    Enable the editing capability of all the text boxes and the Loanable check box
    Disable access to the form's menu
End if

Save button
Ensure that the book number is a valid long integer i.e. between 1 and 2 147 483 647 inclusive. Use the validate numbers routine (Global routine).
If the button's tag property registers that this is a new book operation
    Ensure that the number has not already been allocated to another book
End if
Validate the date registered using the Validate date routine
Validate all the text entries. Use the Validate text routine (Global routine).
Ensure that the Borrowing fee is between 0 and 32 767 inclusive (Validate Numbers)
Validate the loan duration using the global Validate Loan Duration Routine
Confirm the loan duration
Confirm the registration date
Confirm saving the record
Save the data
Enable the read only mode
Erase the text box data
Restore the sorting index
Locate the record just entered or modified
Display the record

Save Data Routine
If the command button's tag property indicates that this is a New book operation then
    Call the save new routine
Otherwise
    Call the save edits routine
End if

Save New Routine
Assign the text box data to a new record
Enter the new book operation transaction

Save Edits Routine
Locate the affected book record
Assign the text box data to a record
Enter the edit book operation transaction including details of the edited columns

Menu : Edit
If the books table is empty
    Abort operation
Else
    Mark the Record being displayed
    Disable the Read Only Mode
    Reformat the Date registered to a short date
    Reformat the borrowing fee to cents only
    Disable access to the Book number text box
    Disable the find free number text box
    Enter the unedited property values in the tag properties of the controls
    Specify in the Save button's tag property that this is an Edit property
End if

Cancel Button
Cancel all updates in progress
Enable the read only mode
Erase the text box data
Reset the sorting index
Display the record which was being displayed before the editing operation commenced

Find Free Number Button
For Trial number = 1 to 2 147 483 647
    Search for the trial number in the Current and Deregistered books tables
    If the trial number was not found in both the tables then
        Enter it in the Book number text box
        Exit the loop
    End if
Next

Insert Today's date Button
Insert today's date in the date registered text box. Use Short date format.

Deregister : Menu
If the book is on loan or request
    Abort the deregistration operation
Else
    Call the Global routine : Deregister book or subscriber
End if

Go to first / Go to last : Menu
If the books table is empty
Inform the user and Disable all the record manipulation controls
Else
    Move to the First/Last record
    Call the display record routine
End if

Sort : Menu
Mark the displayed record
Load the sort form
Add all the books table indexes to the Sort form's Available Indexes list
Specify the index in use to the Sort form
Specify the table affected as the books table
Display the Sort form

Locate : Menu
Specify the table affected as the Books table
Specify the index in use
Load the Locate form
If the locate form returns a Locate item
    Mark the displayed record
    Locate the locate item
    If the locate item is not found
        Redisplay the record which was being displayed before the failed location attempt
    Else
        Display the located record
    End if
End if

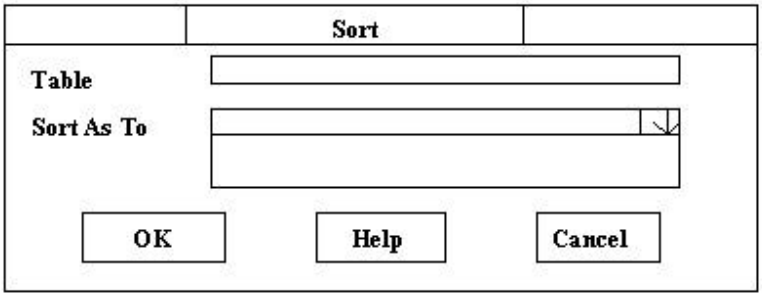
Report : Menu
Transfer the displayed data to a string
Add to the string loan and requisition data if available
Assign the string to the Report form's Text property
Display the Report form

Close : Menu
Activate the Close button

Book number & Borrowing fee Text Boxes Key Press Events
If the key pressed does not represent a digit or the backspace key Then
    Cancel the Keystroke
Else if adding the number represented by the key would result in a number above the limit
    Cancel the Keystroke
End if

Sort Form

Tasks
Assign the index chosen by the User to the Global Sort Index variable for reference later by the calling form.



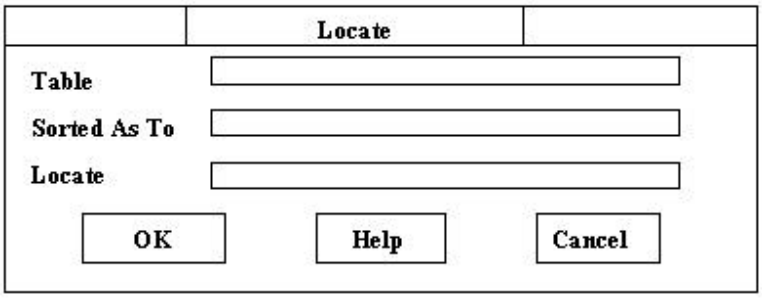
Algorithms by Controls
Ok
Assign the chosen Sort Index to the Global Sort Index variable
Unload the form

Close
Unload the form

Locate Form

Tasks

1. Facilitate the inputting of the Locate item.
2. Validate locate item if it concerns a date
3. Assign the locate item to a Global variable which can be referred to by the calling forms

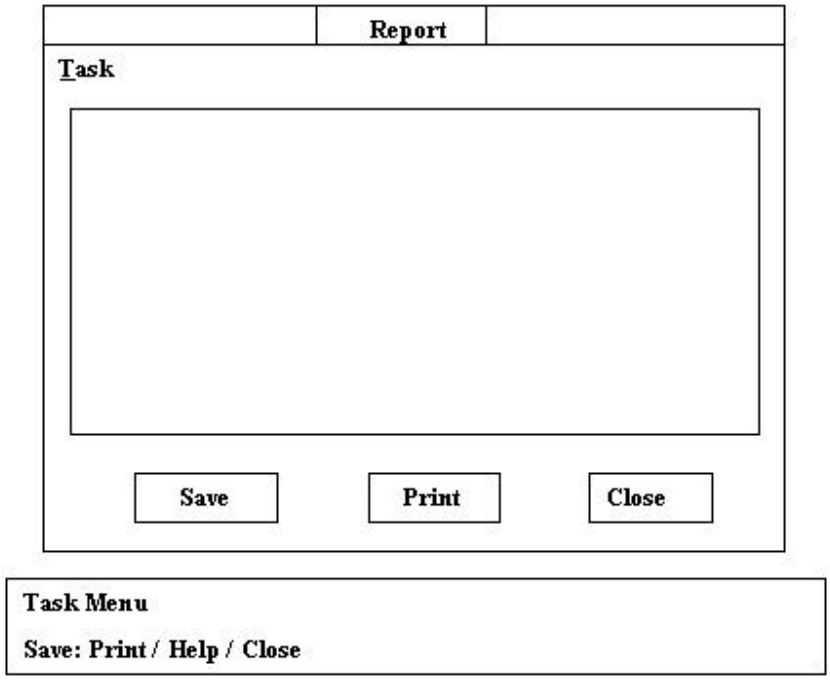


Algorithms by Task

Ok : Button
If the index concerned is the Registered on index or the Deregistered on index or the Expires on index Then Use the validate date routine to validate the entered date
Assign the locate item to a Global Variable
Unload the locate form

Cancel : Button
Unload the Locate form

Report form



Save : Button
Use the Common Dialog control to obtain the file name
Open a text file for output
    Insert the text in the form's text property in the file
Close the file

Print : Button
Use the Common dialog control to obtain the printer options
Send the text displayed to the Printer
End the Print job

Close : Button
Unload the report form

Save : menu
Activate the Save command button

Print : menu
Activate the Print button

Close : menu
Activate the close button

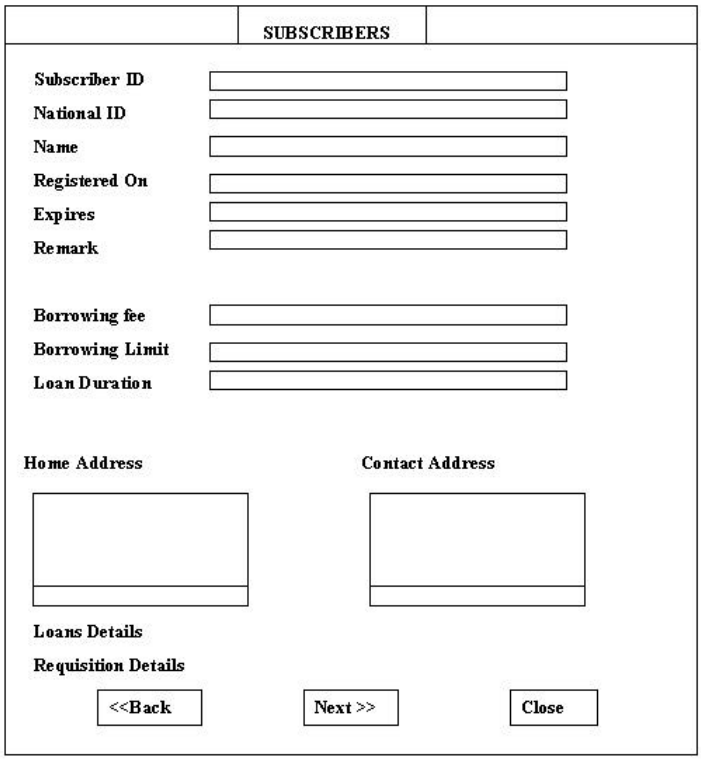
Subscriptions Records Management

Tasks

1. Displaying the details of all valid subscriptions including information on books borrowed and requested.
2. Facilitating the updating of all subscription details including those concerning books borrowed and requested
3. Facilitating the registration, editing and termination of subscriptions.

Plan

As the tasks which this form is supposed to perform are basically the same as those of the book records management form with the only major difference being in the table being managed, I have decided to adopt the book records management algorithms with the following modifications.



Algorithms

New/Edit : Menu

Mark the displayed subscription record
Disable the Read Only Mode
Register The New (Edit) operation in the Save button's tag property
Transfer the subscription ID to the Enter Subscription code text box
For an edit operation disable the Enter Subscriber ID text box
Reformat the Registered on, Expires on and Borrowing fee data
Replace the name text box with the Title, Initials and Surname text boxes
Enter the data in the Title, Initials and Surname text boxes
Register the unedited field values in the text boxes' tag properties

Enter Subscriber ID (Lost focus event) : Text box

```
If the control which now has the focus is the Cancel button then
        Confirm cancellation of the New Subscription operation
        If confirmed then
                cancel it by activating the Cancel button
        Otherwise
                validate the entered Subscriber ID
        End if
Else if the control is the Help button then
        Hand over control without validating the subscriber ID
Else
        Validate the subscriber ID
End if
```

Save : Button

Validate the subscriber ID
If the save button's tag property indicates that this is a New subscription operation then
    If the subscription ID is not unique
        Give an error
        Abort the Operation
    End if
End if
Validate all the data entered using the Global Validation routines
Ensure that the registration date is before the expiry date
Confirm the subscription expiry date
Confirm the subscription registered on date
Confirm the loan duration
Confirm the update
If it is a new subscription record then
    Assign the text box data to a new record and save it
    Enter the new subscription transaction
Else
    Locate the concerned subscription record
    Update the fields using the text box data
    Enter the Edit record transaction paying attention to the edited fields
End if

Books borrowed form link

Use the following SQL to find all the books borrowed by the subscriber

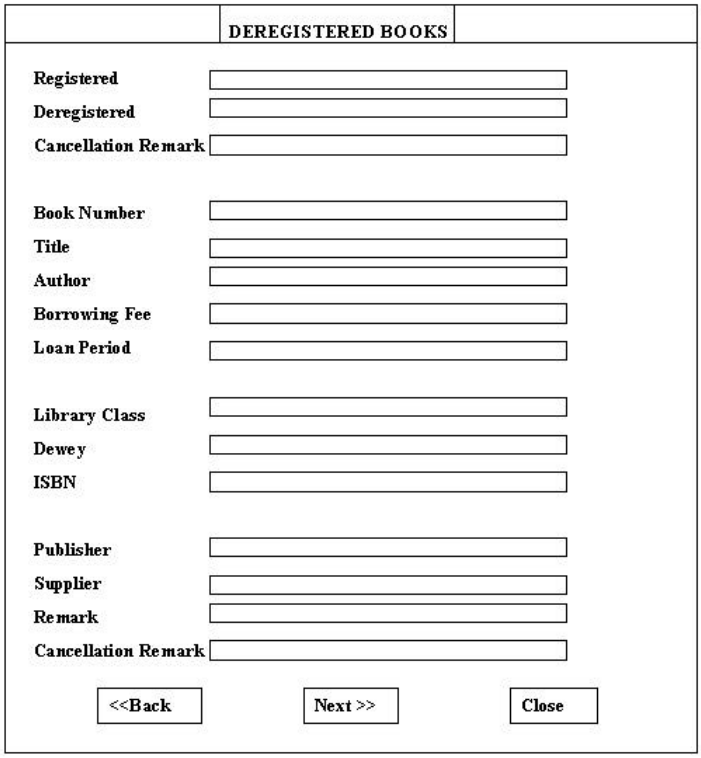
```
Parameters [subscriber] Text
Select *
From [books borrowed table]
Where [subscriber id] = [Subscriber]
```

Define the Query parameter 'Subscriber' as the Subscriber's ID
Execute the Query and ensure that it has returned some records before proceeding
Load the books borrowed or requested form
Customise the books borrowed or requested form
Show the books borrowed or requested form
Relocate the subscription record
Redisplay the subscription data

Deregistered Books

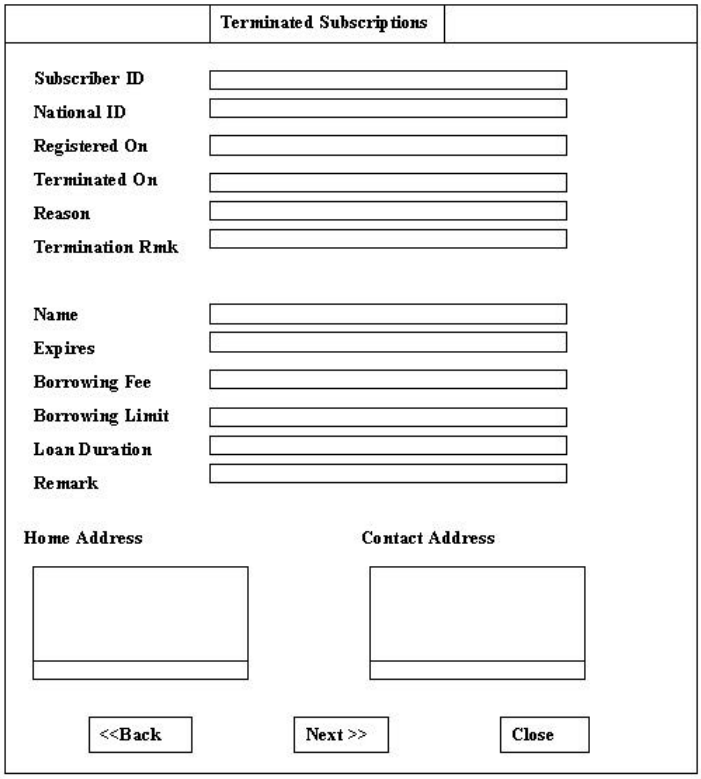
Plan

The plan is to have a simple form displaying one record at a time as detailed in the diagram below. The form will have the same browsing features as the other file management forms but it will not have any editing capabilities. The browsing features are detailed in the menu plan below the main diagram. All the features will be based on the general file management algorithms detailed in the books form's design.



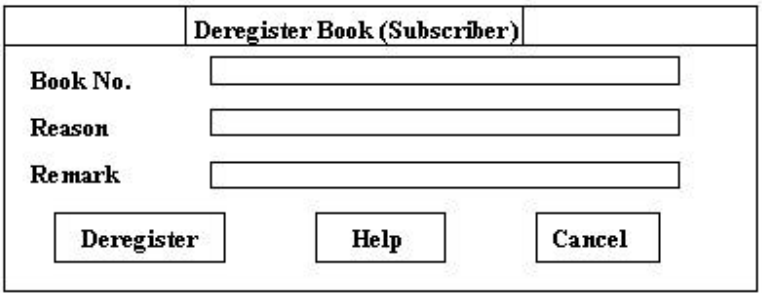
Terminated Subscriptions

Plan
The terminated subscriptions form will be based on the design principles outlined under Deregistered Books.



Deregister Book or Subscriber

Task
Facilitate the deregistration of books and subscribers



Algorithms by task
Deregister :Button
Validate the Reason and remark entered. The remark is optional.
If it is a Book deregistration then
    Locate the book record
    Enter the located record in the books Deregisterd table
    Add the Date deregistered, Reason and Remark
Enter the deregistration transaction in the book transaction log
    Delete the deregistered book's record from the Book table
Else
    Locate the subscription record
    Enter the located record in the Terminated subscriptions table
    Add the Date deregistered, Reason and Remark
    Enter the termination transaction in the subscriptions transaction log
    Delete the terminated subscription's record from the Subscriptions table
End if
Unload the Deregistration form

Cancel : Button
Unload the Deregistration form

Global Routines

I have decided to place the global routines in two modules. The General global routines will make up one module whilst the validation routines will make up the other.
It should be noted that the need for most of the General Global routines was actually discovered during the coding of the programs.

General Global Routines

Get formatted Address
Used to format the Multi-line addresses into a suitable form for the Report and Search Forms.
Declare the following variables
All text read ; Variable for stopping the loop
MyLine ; Variable for holding the text between two carriage returns
Result ; Variable for holding the formatted address
Counter = 1 ; Variable for marking the character being read
Start Count =1; Variable for marking where to start reading the next line
Repeat
If the next two characters are a carriage return followed by a line feed then
Indicate that the Address contains more than one line
MyLine = Text between Start count and Counter
If the Result variable is empty then
Add the line with only one indent
Otherwise
Add the line with a double indent
End if
Skip over line feeds and indents
If all the text has been read then All text read = true
Mark where to start reading the next line
Else
If all the text has been read
If this is the fist line found then
Add the line with only one indent
Otherwise
Add the line with a double indent
End if
Set All text read to true
Else
Increase Counter by One
End if
End if
Until All the text has been read

Compare text
Strip the text of all leading and trailing spaces
Compare the upper case versions of the text

Validation Routines

Validate Loan Duration
Conditions

- If the variable is blank then it should be change to 00M00D
- The variable must be 6 characters long
- The third and sixth characters must be M and D respectively
- The number of months must be between 1 and 12 inclusive
- The number of days must be between 1 and 31 inclusive

Confirm Loan Duration
Interpret the loan duration and present it in a message box asking for confirmation

Validate date
Conditions

- The date must be 10 characters long
- The day must range from 1 to 31 inclusive
- The month must be between 1 and 12 inclusive
- The year must be between 1800 and 2100 inclusive

Confirm date
Interpret the date and present it in a message box asking for confirmation

Validate numbers
Variables passed
    Text box concerned
    Lower limit
    Upper limit
    Description

Validate text
Variables passed
    Text box
    Maximum length
    Permit null
Procedure
    Strip the text of all leading and trailing spaces, carriage returns and line feeds
    If the text is longer than the stated limit the
        Generate error
    Else if the text is a null string
        If nulls are allowed then
            Replace the text with a '(none)'
        Otherwise generate an error
        End if
    End if

Validate Subscriber ID

Variables passed

Text box concerned

Conditions

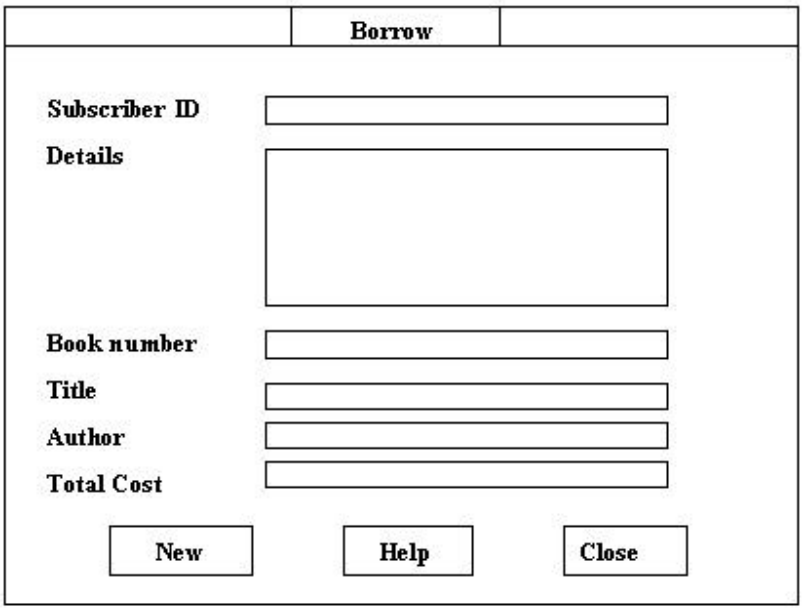
- The subscriber ID must be 8 characters long
- The character pattern must match that in the subscription array

Output

- An error report with the affected text box highlighted

Loan and Requisition Handling

Borrowing form



Subscriber text box : Keypress event
If the key pressed was an enter key then
    Obtain the subscription details and paste them in the Details text box
End if

Subscriber text box : Lostfocus Event
If the control with the focus is a command button then
Hand over the control of the form to the button
Else
    Validate the subscriber ID
End if

Books text box : Keypress event

If the key pressed was the enter key then
    If the Confirm flag is down
        Validate the entered book number
        Ensure that the book can be loaned successfully
        Ensure that the subscription is valid
        Check the limit of the subscriber and ensure that he can borrow more books
        Enter the books title in the Book title text box
        Obtain the borrowing fee of the book
        Add the borrowing fee to the current total cost
        Enter the new Total cost in the Cost text box
        Raise the confirm flag
    Else
        Ensure that the subscription is valid once again
        Ensure that the book can be loaned out
        Make the loan
        Lower the Confirm flag
        Clear the Books, Title and Author text boxes
    End if
Else
    If the Confirm flag is up then
        Lower the Confirm flag
        Subtract the cost of the last book from the total cost and update the display
        Clear the Author and Title text boxes
    End if
End if

Get the borrowing fee

Obtain the basis for the borrowing fee from the set-up table
If it is a fixed basis then
    Obtain the fixed book charge from the set-up table and assign it to the borrowing fee
Else if it is on Subscription basis then
    Obtain the borrowing fee from the subscriptions table and assign it to the borrowing fee
Else if it is on Book by books basis then
    Obtain the borrowing fee from the books table and assign it to the borrowing fee
Else if it is a book and subscription basis
    Add the book and subscription borrowing fees and assign it to the borrowing fee
End if

Ensure that the book can be borrowed

Ensure that the book number exists
Ensure that the book's loanable property is set to true
Ensure that the book has not been borrowed

If the book appears in the requisition table then
    If the person who made the requisition is not the one trying to borrow it
        Generate an error
    End if
End if
If the loan period for the book is 00M00D then warn the user

Make the loan
If the book had been on request
    Enter the requisition processing transaction
    Delete the requisition from the Requests table
End if
Add the loan to the Borrowed books table
Enter the loan transaction in the log table

Get due date
If loan duration is fixed then
    Obtain the fixed loan duration from the set-up file
Else if the loan duration is as to books then
    Obtain the loan duration in the books table
Else if the loan duration is as to subscriptions then
    Use the loan duration in the subscriptions table
End if

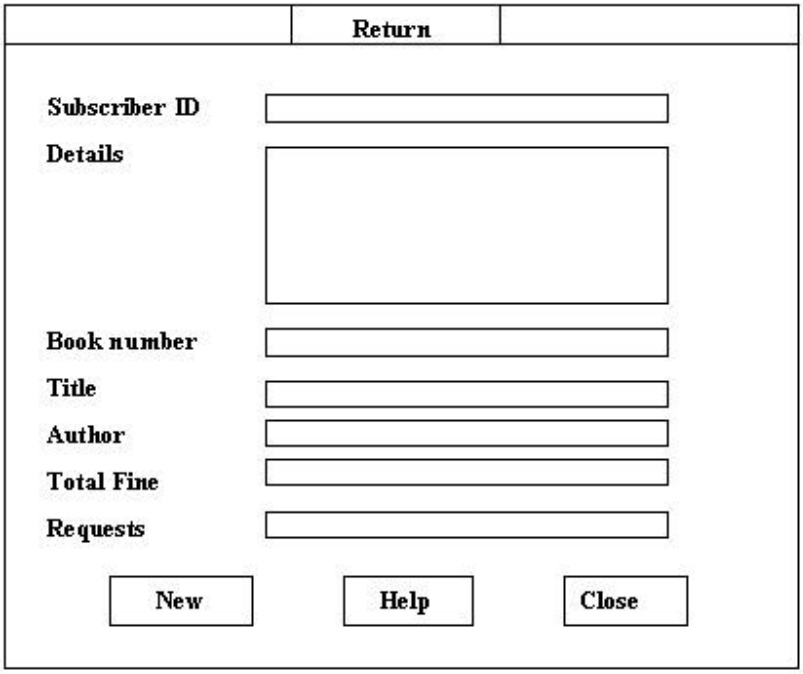
Check subscriber's limit
Use SQL to obtain the number of books borrowed by a subscriber
Compare the above number with the subscriber's limit
If the subscriber has exceeded or reached this limit then abort any loan operation in progress

New : Button
Lower the confirm flag
Set the total cost to 0
Set the cost of the last book to 0
Erase all the text box data
Give the Enter subscription Id textbox the focus

Refresh Details : Button
Recall the Obtain subscription details routine

Close : Button
Activate the New button and hide the form

Returning Books



Subscriber ID : Text Box : Keypress and Lostfocus events
Same as for the Borrow form

Refresh Subscriber Details : Button
Same as for the Borrow form

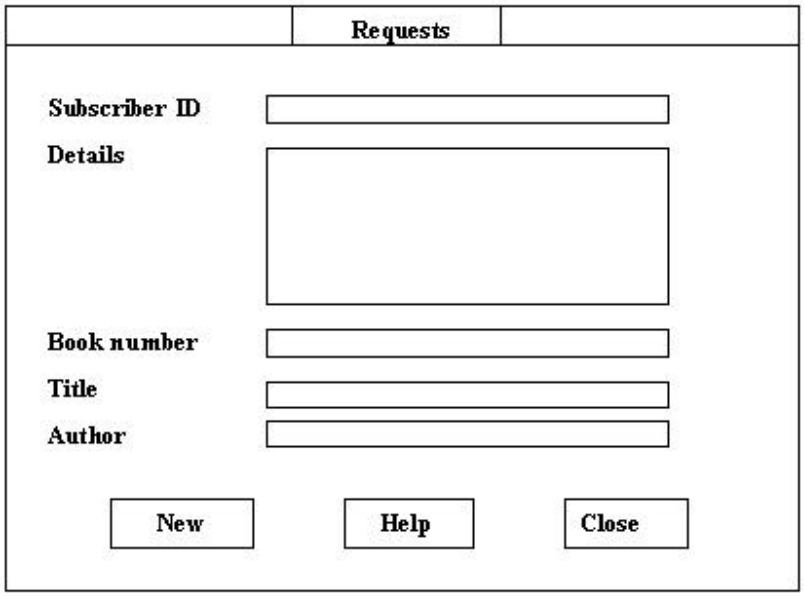
Books textbox : Keypress event
If the key pressed was the enter key then
    If the Confirm flag is down
        Ensure that the subscription exists
        Validate the entered book number
        Ensure that the book exists and is actually on loan to the named subscriber
        Enter the books title in the Book title text box
        If the book is overdue calculate the fine
        Add the fine on the book to the total fine
        Enter the new Total fine in the Fine text box
        Raise the confirm flag
    Else
        Ensure that the subscription exists
        Ensure that the book exists and is actually on loan to the named subscriber
        Cancel out the loan
        Lower the Confirm flag
        Clear the Books, Title and Author text boxes
    End if
Else
    If the Confirm flag is up then
        Lower the Confirm flag
        Subtract the fine on the last book from the total fine and update the display
        Clear the Author and Title text boxes
    End if
End if

Cancelling the loan
Locate the loan record
Copy its contents to the Main log as a return transaction
Delete the loan record
If the book is on request then add its number to the Requests textbox's text

New : Button
Set the total fine to 0
Set the fine on the last book to 0
Clear all the text in all the text boxes

Close : Button
Activate the New button and hide the form

Requisitions Form



Subscriber ID : Text Box : Keypress and Lostfocus events
Same as for the Borrow form

Refresh Subscriber Details : Button
Same as for the Borrow form

Books text box : Keypress event
If the key pressed was the enter key then
    If the Confirm flag is down
        Validate the entered book number
        Ensure that the book can be requested
        Ensure that the subscription exists and has not expired
        Ensure that the subscriber has neither reached nor exceeded has requisition limit
        Enter the books title in the Book title text box
        If the book is overdue calculate the fine
        Raise the confirm flag
    Else
        Ensure that the subscriber has not exceeded his borrowing limit
        Ensure that the book can be requested
        Enter the request
        Lower the Confirm flag
        Clear the Books, Title and Author text boxes
    End if
Else
    If the Confirm flag is up then
        Lower the Confirm flag
        Clear the Author and Title text boxes
    End if
End if

Ensure that the book can be requested
Ensure that the book exists
Ensure that the book has been borrowed by someone other than the person trying to request it
Ensure that the book has not already been requested

Entering the request
Calculate the expiry date by adding the requisition duration to the date on which the book is due
Add the requisition to the requisition table
Add the requisition transaction to the Main log

New : Button
Clear all the text boxes

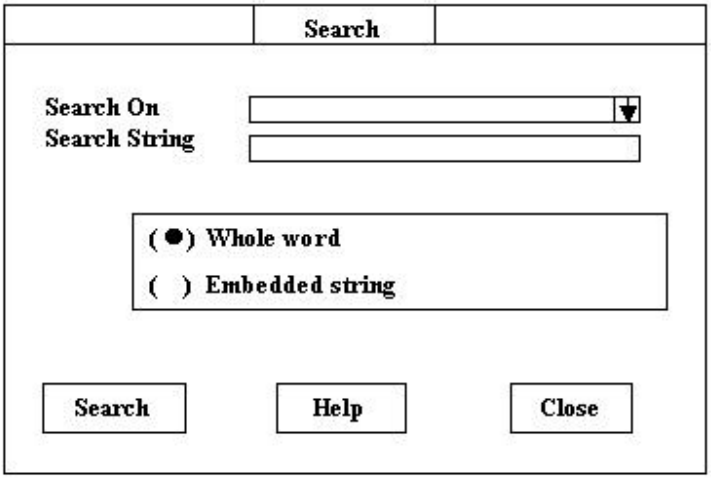
Close : Button
Activate the New button and hide the form

Search Utilities

Search Form (Located in the main program)

Plan

This search utility will facilitate whole word searches through the implementation of parameter queries and embedded string searches based on the copying of a whole table to a temporary table and then selecting the records that are required. The embedded searching will be carried out by a different module.



Queries

Book number

```
PARAMETERS [My Book number] Long
SELECT [Books table].*,
            [Books borrowed table].[subscriber id] as [Out to],

            [Books borrowed table].[Date borrowed],
            [Books borrowed table].[Date due],
            [Books requested table].[subscriber id] as [Requested by],
            [Books requested table].[Date requested],
            [Books requested table].[Expiry Date]
FROM [Books requested table] right join ([Books table]
LEFT JOIN [Books borrowed table]
ON [Books table].[Book number] = [Books borrowed table].[Book number])
ON [books requested table].[book number] = [Books table].[book number]
WHERE [Books table].[Book number] = [My Book Number]
```

Book author search

```
PARAMETERS [My Book Author] Text;
SELECT [Books table].*,
        [Books borrowed table].[subscriber id] as [Out to],
        [Books borrowed table].[Date borrowed],
        [Books borrowed table].[Date due],
        [Books requested table].[subscriber id] as [Requested by],
        [Books requested table].[Date requested],
        [Books requested table].[Expiry Date]
FROM [Books requested table]
RIGHT JOIN ([Books table] LEFT JOIN [Books borrowed table]
ON [Books table].[Book number] = [Books borrowed table].[Book number])
ON [books requested table].[book number] = [Books table].[book number]
WHERE [Books table].[Book author] = [My Book Author]
```

Book title search

```
PARAMETERS [My Book title] Text;
SELECT [Books table].*,
        [Books borrowed table].[subscriber id] as [Out to],
        [Books borrowed table].[Date borrowed],
        [Books borrowed table].[Date due],
        [Books requested table].[subscriber id] as [Requested by],
        [Books requested table].[Date requested],
        [Books requested table].[Expiry Date]
FROM [Books requested table]
RIGHT JOIN ([Books table]
LEFT JOIN [Books borrowed table]
ON [Books table].[Book number] = [Books borrowed table].[Book number])
ON [books requested table].[book number] = [Books table].[book number]
WHERE [Books table].[Book title] = [My Book Title]
```

Subscriber ID search

```
PARAMETERS [My Subscriber ID] Text;
SELECT *
FROM [Subscriber table]
WHERE [Subscriber table].[Subscriber ID] = [My Subscriber ID]
```

Subscriber surname search

```
PARAMETERS [My Surname] Text;
SELECT *
FROM [Subscriber table]
WHERE [Subscriber table].[Surname] = [My Surname]
```

Subscriber initials search
```
PARAMETERS [My Initials] Text;
SELECT *
FROM [Subscriber table]
WHERE [Subscriber table].[Initials] = [My Initials]
```

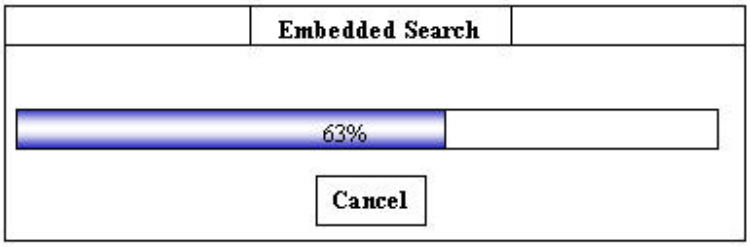
Subscriber title search
```
PARAMETERS [My Title] Text;
SELECT *
FROM [Subscriber table]
WHERE [Subscriber table].[subscriber title] = [My Title]
```

Algorithms

Search : Button

```
If the search is a whole word search then
        Execute the relevent Query
        If the Query does not return any records then
                Inform the user that the search was unsuccessful
        Else
                Load the search results form
        End if
Else
        Load the embedded search form
End if
```

Embedded Search Program



Plan
The plan is to have a search table containing all the possible book or subscriber records which may contain the specified string. The records will then be tested one by one and all those not containing the string will be deleted from the temporary search table. At the end of the process only those containing the specified string will be left in the table and they will be presented to the Search results form.

Queries
Subscription searches

```
Select *
INTO [Search] IN ''' + Working_db_path + '''
FROM [Subscriber table];
```

Subscription Searches

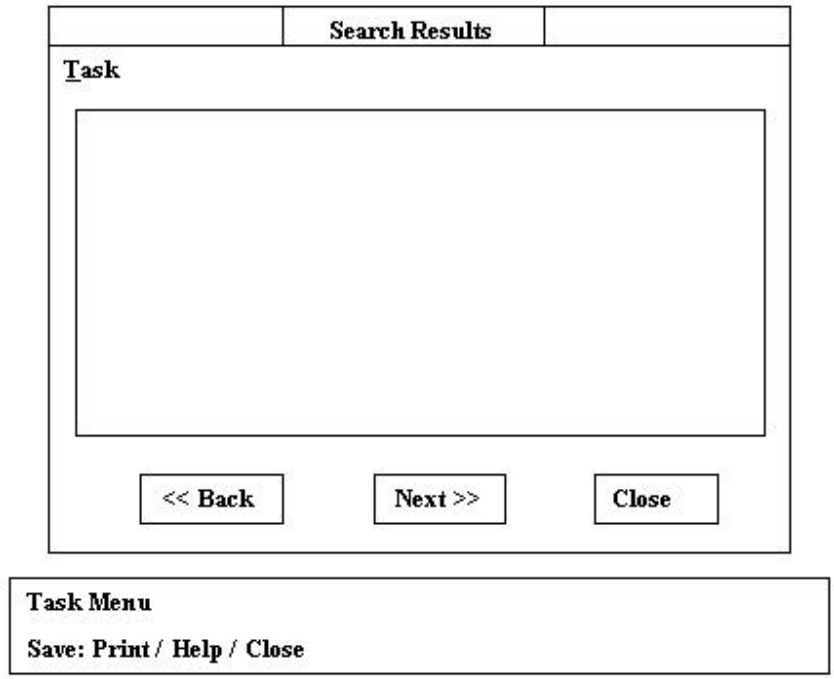
```
Select [Books table].*
        [Books borrowed table].[subscriber id] as [Out to],
        [Books borrowed table].[Date borrowed],
        [Books borrowed table].[Date due],
        [Books requested table].[subscriber id] as [Requested by],
        [Books requested table].[Date requested],
        [Books requested table].[Expiry Date]
INTO [Search] IN ''' + Working_db_path + '''
FROM [Books requested table]
RIGHT JOIN ([Books table]
LEFT JOIN [Books borrowed table]
ON [Books table].[Book number] = [Books borrowed table].[Book number])
ON [books requested table].[book number] = [Books table].[book number]; ''
```

Algorithm

Set the start length and the number of records processed to 0
Create an empty working database
Use the relevant make table query to build the source search table
Record the initial table length
Specify the column concerned
Repeat
    If the field does not contain the string then delete the record
    Increment the number of records processed by 1
    Calculate the percentage processed i.e. (Number processed / Initial table length)
    Report the percentage processed
    Move to the next record
Until the end of the table is reached

If the temporary search table is empty then
    Inform the user that no matches were found
Else
    Load the Results form
End if

Search Results Form



Queries

Books Borrowed Query
Parameter [Subscriber] Text
Select *
From [Books borrowed table]
Where [Subscriber ID] = [Subscriber]

Books Requested Query
Parameter [Subscriber] Text
Select *
From [Books requested table]
Where [Subscriber ID] = [Subscriber]

Algorithms

Form Activate
Set the current record to 1
If it is a book search then
    Display the first book record
Else
    Display the first subscription record
End if

Displaying a book record
Print ‘Match x of y’
Include the book details from the books table
Add the requisition and loan data if present

Displaying a subscription record
Print ‘Match x of y’
Add the subscription details from the subscriptions table
Execute the books borrowed query and append its output
Execute the books requested query and append its output

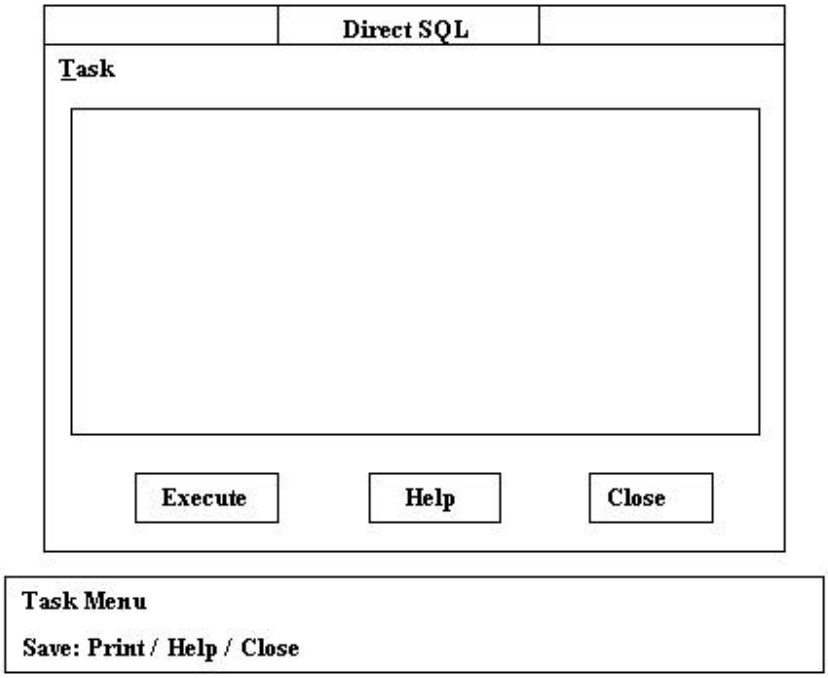
Next : Button
If the current record is not the last record then
    Increment the current record marker
    If it is a book search then
        Display the book record
    Else
        Display the subscription record
    End if
End if

Previous : Button
If the current record is not the first record then
    Decrement the current record marker
    If it is a book search then
        Display the book record
    Else
        Display the subscription record
    End if
End if

Close : Button
Unload the search results form

Save & Print : Menu Options
Same as for the report form

Direct SQL Input Form



Algorithms

Form Load

Ensure that only one instance of the program is running

Form Activate

If the form is loading then
    Open the main and transaction databases
End if

Execute : Button

Strip the SQL of all leading spaces, tabs, line feeds and carriage returns
Ensure that the SQL is not a make table query
Execute the query
If the query fails to execute or does not return any records then
    Raise an error
Else
    Load and run the Show SQL Results form
End if

Open : Menu
Get the file name
Open the file
If the file is not larger than 30 kb then
    Assign the file's contents to the text box
End if

Print : Menu
Get the printing specifications
If the user wants to print only the selected set then
    Print the selected text only
Else
    Print all the text in the text box
End if

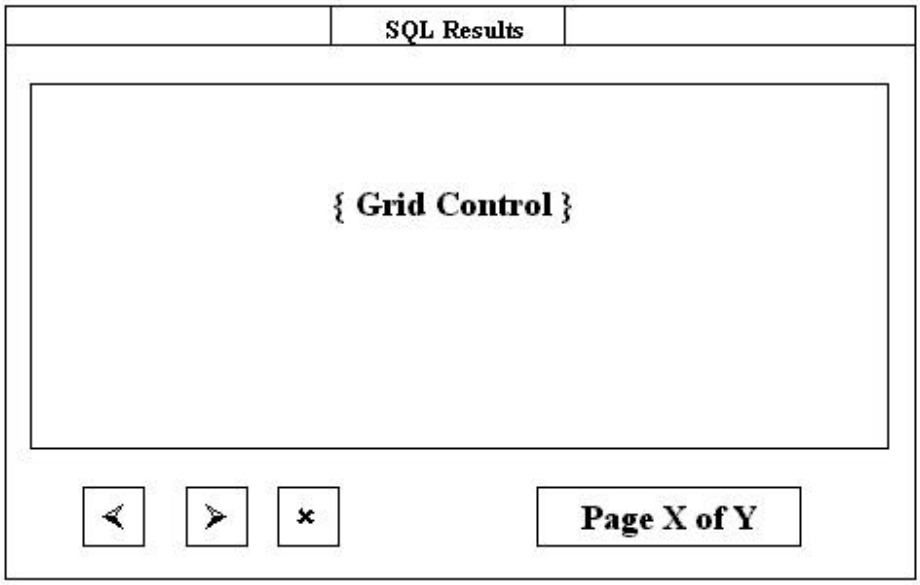
Save : Menu
Get the file name
Open the file for output
Insert contents in the file specified

Build SQL : Menu
Simulate a click of the Execute button

Close : Menu
Simulate a click of the Close button

SQL Program : Results Form

Form



Algorithms

Form Load

If the source recordset is not empty then
    Set the number of grid columns to the to the number of fields in the recordset
    Enter the field names
    Calculate the number of pages at 1000 rows per page
    Display the current page
End if

Next : Button

If the current page is not the last page then
    Increment the page counter
    Display the current page
End if

Back : Button

If the current page is not the first page then
    Decrement the page counter
    Display the current page
End if

Displaying the current page
If the recordset is not empty then
    Move to the beginning of the current page
    Update the page indicator
    For each of the 1000 rows in the current page
        If the current record is the end of table marker then
            Clear the remaining cells
        Else
            For each of the fields in the current record
                Display as to type (i.e. Date, Boolean or otherwise)
            Next
        End if
        Move to the next record
    Next
End if

Close : Button
Unload the results form

System Configuration

Installation Program

The setup program will be generated by the Visual Basic Package and deployment wizard

Database Initialisation

The database initialisation will be modelled along the lines of Setup Wizards with the steps outlined below. Each step will be validated before the one after it is executed.

1. A brief introduction to the initialisation process
2. Product registration by specifying the licensed user
   - The input will have to be checked to ensure that it is not a blank.
3. Specification of the primary user's profile i.e.
   - Name
   - Password
   - Confirmation of Password
4. Specification of the main database
   - Must be checked to ensure that it is not blank
5. Specification of the transaction database
   - Must be checked to ensure that it is not blank and that it is different from the one specified for the main database
6. Specification of the temporary database
   - Must be checked to ensure that it is not blank and that it is different from the ones specified for the main and transactions databases
7. Specification of the subscription ID mask
   - Must be 8 characters long and composed of L's and D's only
   - Must be converted to upper case before validation and storage
8. Confirmation of details before commitment
9. Confirmation of commitment
   - Create the main database and enter the default values for the setup table
   - Create the transactions database
   - The working database will only be created when needed
   - Create the initialisation file
   - Remind the user of the need to modify the setup defaults

Setup form (Located in the main Program)

Plan
As it will not be possible to display all the system properties in one window at the same time, I have decided to place the properties into the following categories

- ☞ Formats Collection
  - Subscriber ID mask (Read only)
  - Date format
    - Week Day
    - Day
    - Month
    - Year
- ☞ Limits Collection
  - Borrowing limit as to
  - Fixed borrowing limit
  - Requisition limit as to
  - Fixed requisition limit
  - Loan duration as to
  - Fixed loan duration
  - Requisition valid for
- ☞ Charges Collection
  - Books charged as to
  - Fixed borrowing fee
  - Fine per day
- ☞ Users collection
  - User 1 name
  - User 1 password
  - User 2 name
  - User 2 password
  - User 3 name
  - User 3 password
- ☞ Start-up collection
  - Show statistics
  - Confirm date

The last category does not appear in the design and the need for it only became apparent when I was going over the Configuration settings. Each category will be allocated a window which will be activated by clicking on the corresponding button on the categories ribbon.

Algorithms

Form Load
Lower the Already loaded flag

Form Activate
If the Already Loaded flag is down then
    Raise it
Assign the setup table property value to the corresponding controls
End if

Change password : Button Array
Ensure that the user name has been entered first
Load the change password form
Ensure that the password returned is unique

Save : Button
Ensure that all the data has been entered.
    Only the user information regarding to Users 2 & 3 may be left blank.
Ensure that all the data in the text boxes is within the valid ranges.
Convert the data into the form expected by the setup table and update the table
Update the system variable relating to date formats

Close : Button
Prompt the user to save the information
If the user requests a Save operation then activate the Save button
Unload the form

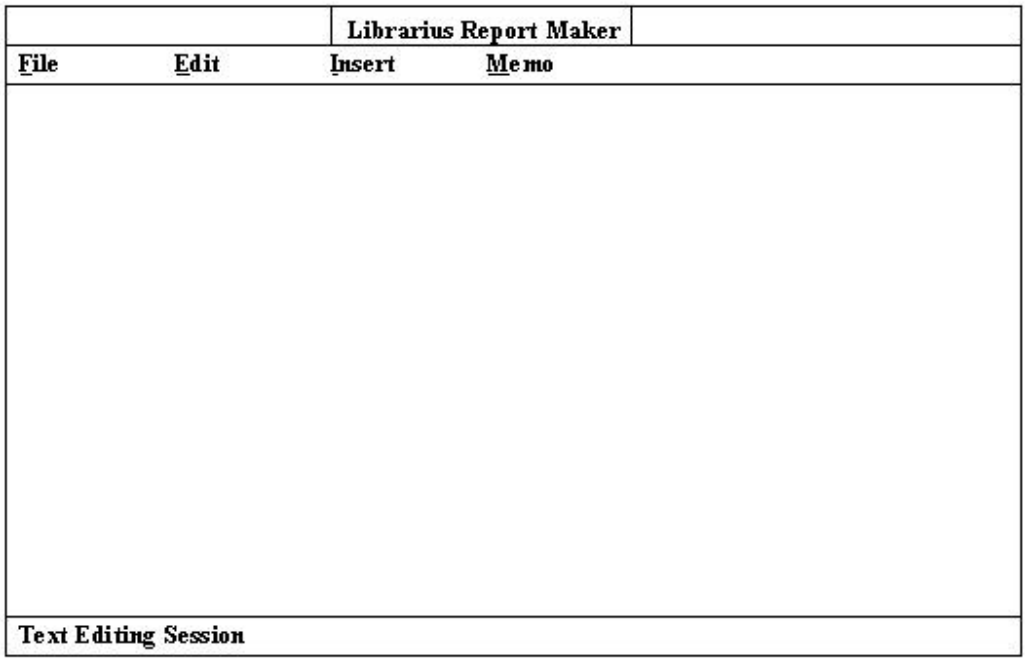
Change Password Form

Password Text box : Keypress Event
If the key is neither a letter nor a digit then
    Cancel the keystroke
End if

OK : Button
If the confirm flag is up then
    Compare the passwords in the text box's tag and text properties
    If the two passwords are the same then
        Place the password in the calling button's tag property
    Else
        Inform the user of the mismatch
        Clear the text box's tag and text properties to facilitate re-entry
        Lower the confirm flag
    End if
Else
    Assign the password in the text box's text property to its tag property
    Clear the text property
    Raise the confirm flag
End if

The Report Writing Utilities

Main Report Form



General Algorithms

Form Activate
If the form is loading then
    Open the main and transactions databases
    Get the preferred session from the user
    If the session is a mail merge session then
        Show the merge menu and hide the report menu
        Get the SQL source file's filename and open it
        If the file exists and is not empty then
            Check the integrity of the SQL
        Else
            Report the Error
            Load the text editing session
        End if
    Else if it is a report making session then
        Show the report menu and hide the merge menu
        Get the SQL file's filename and try to open it
        If the file exists and is not empty then
            Check the integrity of the SQL
        Else
            Report the Error
            Load the text editing session
        End if
    Else
        Assume a text editing session
        Hide both the report and merge menus
    End if
End if

Algorithms : Reports Section

Choose Report fields
Load the Choose report fields form

Trim Report fields
Load the trim fields form

Build Report : Menu
Build the report array
Print the report

Building the report Array

The array will be as follows

Field Name	Data Type	Length	Start Position

Set the number of rows in the array to the number of fields in each returned record
For each field in the recordset enter the Name, Data type and length
Set the start position of the first field to 0
Total = The first field's length
For each of the remaining fields if any
    Set the start position to Total +1
    Add the field's length to Total
Next

Printing the Report

Set the printer's position to the top left edge of the paper
Print the header text in the report form's text box
Add 2 blank lines
Print the column headers
Draw a line just below the headers

For each record in the recordset
    Offset = 0
    For each row in the array
        If the field is a date field with time info then
            Use the mask 'dd/mm/yyyy hh:nn'
        Else if it is a date filed without time info then
            Use the mask 'dd/mm/yyyy'
        Else if it is a Boolean value then
            Replace True with Yes and False with No
        Else
            Assign the data as it is to a string
        End if

        Move the print position to the start position for the filed
        If the string contains a carriage return then
            Use the multi-line printing routine
            Set Offset to the number of rows in the string
        Else
            Print the string as it is
            Set offset to 1
        End if
        Add Offset to the Printer's current row position
    Next
Next

Printing the Column headers

For each row in the array
    Move the Printer's column pointer to the field's start position
    Print the field name
Next

Printing multi-line text

Declare the following
    All text read : Variable for stopping the loop
    My line   : Variable for holding the text between 2 carriage returns
    Current_postn : Pointer to the current character being read
    Start Count   : Variable for marking the read for the next line

Start count = 1
Strip the text of any leading spaces, carriage returns and line feeds
If there is no remaining text after stripping then exit the routine
Repeat
    If the current characters is a carriage return or a line feed then
        MyLine = Text between Start_count and Current_position -1
        Move the x pointer to the field's start position
        Print MyLine
        Add 1 to both offset and the printer's current row
        Skip over line feeds and carriage returns
        If all the text has been read then
            Raise the All text read flag
        Else
            Mark where to begin the next read (Start count)
        End if
    Else
        If the current character is an end of string character then
            MyLine = Text between Start Count and the current position
            Move the x pointer to the field's start position
            Print MyLine
            Add 1 to both offset and the printer's current row
            Raise the all text read flag
        Else
            Move to the next character
        End if
    End if
Until the All text read flag is up

Algorithms: Mail Merge Section

Insert Merge Field :Menu
Run the insert merge filed form

Begin mail Merge : Menu
Validate the starndard letter
Build the merge letter array
Print the letters

Validating the standard letter
Current position = 1
Repeat
    If the current character is "{"then
        Mark the beginning of the field as Current Position + 1
        Repeat
            Current position = Current position +1
            If the current letter is '}' then
                Record the text between '{' and '}' as a field name
                Search for the filed name in the list f available fields
                If it is not found then
                    Report the error
                    Abort the compile standard letter operation
                Else
                    Raise the field verified flag
                End if
            Else if the current character is a '}' then
                Give Error : Field name found within another field name
                Abort the compile standard letter operation
            Else if the current character is the last character in the string then
                Give Error : End of field name not found
                Abort the compile standard letter operation
            End if
        Until Field verified
    Else
        Current position = Current Position +1
    End if
Until the current character is the last character

Building the merge array

Array Structure

Field Type	Start	End

Set array dimensions : 3 columns and 1 row
Current_array_row = 1

If the first character is '{' then
    Array[Field_type] = Field_name
Else
    Array[Field_type] = Text_info
End if

Array[Start] = 1

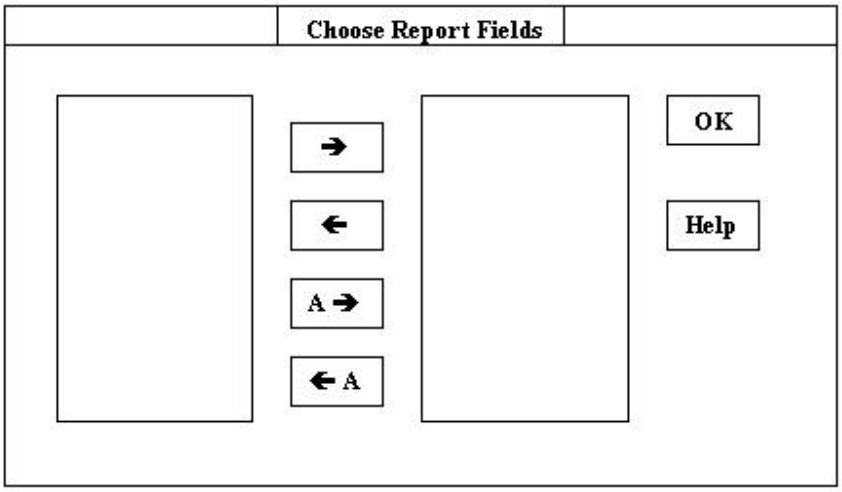
Repeat
    If current character is '{' then
        If not consecutive fields then
            Array[End] = Current position – 1
        End if
        Current array row = Current array row + 1
        Increment the number of rows in array by 1
        Move to next row in array
        Array[Field_type] = Field_name
        Array[Start] = Current Position + 1
    Else if the current character is '}' then
        Array[End] = Current Position – 1
        If the current character is the last then
            Raise flag : Array building through
        Else
            Increment Current position by 1
            If the current character is '{' then
                Raise flag : Consecutive fields
            Else
                Lower flag : Consecutive fields
                Increment the number of rows in the array by 1
                Move to the next row in the array
                Array[Field_type] = Text_info
                Array[Start] = Current position
            End if
        End if

```
        Else
                If the current character is also the last character then
                        Array[End] = Current Position
                        Raise flag : Array building through
                Else
                        Current Position = Current Position +1
                End if
        End if
Until Array building is through

Print the merge letters
For each records in the Query result
        For each row in the Merge array
                If Array[Field_type] = Text_info then
                        Insertion = Text between Start and End inclusive
                        Add the insertion to the merge text
                Else
                        Field name = Text between Start and End inclusive
                        Insertion = Field value
                        If the field is a date field then
                                Format the insertion as to the system's date format
                                If it contains time information then
                                        Add the time to the formatted insertion
                                End if
                        Else if it is a Boolean field then
                                Replace True with Yes and False with No
                        End if
                        Add the formatted insertion to the merge text
                End if
        Next
        Print the merge text on a new page
        Reset the merge text to nothing
Next
Send the job to the printer

Report Text Box : Mouse Down Event
If the right mouse button was pressed and if it is a Merge session then
        Load the merge pop up menu
        Insert the chosen field name in the text at the cursor's position
End if
```

Choose Report Fields Form



Form Load
Place all the fields in the recordset in the fields available list box

Choose All : Button
Move all the fields in the ‘available’ list to the ‘chosen’ list

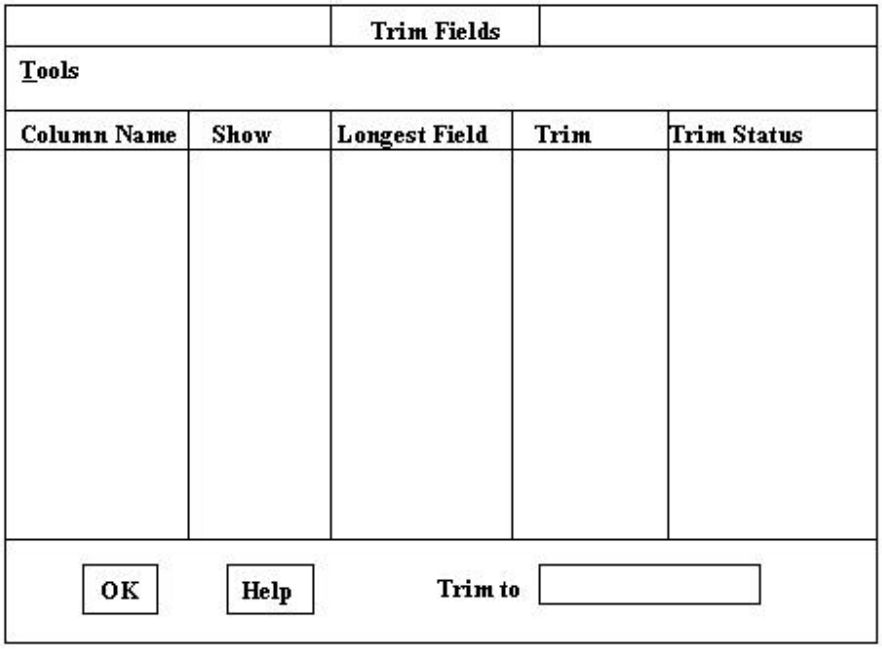
Choose : Button
Move the highlighted field to the ‘chosen list’

Undo All Choices : Button
Move all the fields in the ‘Chosen’ list back to the ‘Available’ list

Undo Choice
Move the highlighted item back to the ‘Available’ list

OK : Button
Show the trim fields form
Hide the choose report fields form

Report Program : Trim Fields Field Form



Form Load
Set the number of rows in the grid to the number of Available fields +1
Enter the column titles
Enter the row numbers
Enter the field names in the first non fixed column
For each column in the recordset
    Locate its row in the grid and move to it
    If the column contains date data then
        For each field in the column
            If it contains time info then
                Longest field length is 16
            Else
                If a field with time info has not yet been encountered then
                    Longest field length is 10
                End if
            End if
        Next
        Insert the longest field length
        Specify that the column length cannot be reduced

```
        Else if  it contains numerical data then
                For each field in the column
                        If its length exceeds the current longest then
                                Longest length = Current field length
                        End if
                Next
                Insert the longest field length
                Specify that the column length cannot be reduced
        Else if it is a text column
                For each field in the column
                        If the string contains a carriage return then
                                Get the longest line in the string
                                If this length exceeds the current longest
                                        Set longest to current length
                                End if
                                Raise flag : Multi line
                        Else
                                If the string's length exceeds the current longest
                                        Set longest to current length
                                End if
                        End if
                Next
                Insert the value of the longest field length
                If the Multi line flag is up then
                        Specify that the column length cannot be reduced
                        Lower flag : Multi line
                End if
        End if
Next
```

Form Activate

```
For each row in the grid
        Search for the field name in the chosen list
        If the field name is found then
                Record 'Yes' in the show column
        Else
                Record 'No'
        End if
Next
```

Paper Width : Menu

```
Facilitate choice of printer and paper size
Display the paper width in characters
```

Getting the longest line in a multi line string

```
Start = 1
Repeat
        If the current character is a carriage return then
                Line length = Current position – Start  + 1
                If Line length > Longest  line then
                        Longest line length = Line length
                End if
                Move to the next character
                Set start to current position
                If the current character is the last then
                        Line length = Current position – Start  + 1
                        If Line length > Longest  line then
                                Longest line length = Line length
                        End if
                        Raise flag : Whole string read
                End if
        Else
                Move to the next character
        End if
Until the whole string flag is up
```

Trimmed Total : Menu

```
For each row in the grid
        If the show column is marked ‘Yes’ then
                If there is a value other than ‘0’ in the Trim column then
                        Add that value to the trimmed total
                Else
                        Add the value of the longest field
                End if
        End if
Next
```

Untrimmed Total : Menu

```
For each row in the grid
        If the show column is marked ‘Yes’ then
                        Add the value of the longest field
        End if
Next
```

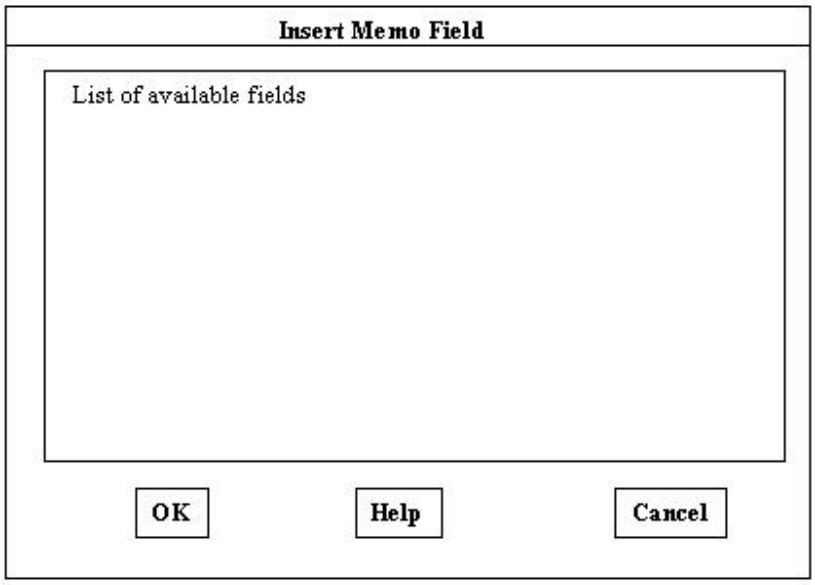
Trim text box : Keypress Event
If the key pressed was the Enter key then
    Read the trimming condition in the trim column
    If it is 'Increase only' permission then
        If the value in the trim is higher than the longest length then
            Approve the trim
        Else
            Reject it
        End if
    Else if it is 'Full Permission'
        Approve the trim
    Else
        Reject the trim
    End if
End if

Close : Button
Hide the trim form

Close : Menu
Activate the Close button

Grid : Change in the current cell position
If the new row is not the title bar row then
    Copy the text in the trim cells to the trim text box
End if

Report Program : Insert Fields



Cancel : Button
Unload the form

OK : Button
Insert the highlighted name into the text at the cursor's current position

Form Activate
Insert the fields in the recordset in the Available fields list box

Transaction Viewing Utilities

Main Form

Librarius 2000 Plus Transactions	
Transactions	
Licensed to :	User :
Date :	Time :

Transactions
Main Log; Subscriber Log; Books Log; Users Log / Help / Exit

General log form

Plan
The modules which will facilitate the viewing of the Transaction logs are basically similar in the tasks they will need to perform with the only difference being in the transaction logs which each will be dealing with. I have therefore decided to develop only one general set of algorithms on it.

Interface (Main Log Form)

Main Transaction Log

Date	Type	Subscriber	Book no.	Extra Date	Amount

← → Jump Help Filter Close Page X of Y

Algorithms

Variables
Page number ; integer
Total pages ; integer
MySQL ; string
Loading ; flag

Form Load : Form Event
Raise the Loading flag

Form Activate : Form Event
If the form is loading then
    Verify table data and load first page
End if

Verify table data and load first page
If the Books log is empty then
    If carrying out a filtering operation then
        Inform the user that there are no records which meet the specified filter condition
    End if
    Disable the next and back buttons and adjust the page indicator
Else
    Specify the column widths and alignments
    Enter the column headers
    Repaginate the list
    Set the page to 1
    Display the current page
End if

Next : Button
If the current page is not the last page
    Increment Page by 1
    Display the current page
End if

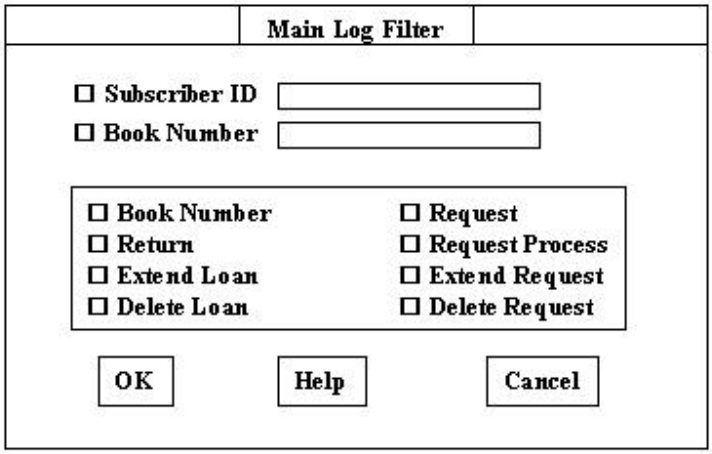
Back : Button
If the current page is not the first page
    Page = Page -1
    Display the current page
End if

Display the current page
Ensure that the Grid has 101 rows
If the log is empty then
    Inform the user of the empty log
    Hide the next and back buttons and adjust the page indicator
Else
    Enable the next and previous buttons
    Move to the start of the page calculated as ; ((Page - 1) * 100)
    Adjust the page indicator
    Repeat 100 times
        If the current record is the End Of File marker then
            Remove the remaining rows in the Grid
        Else
            Enter the row number
            Enter the field data in the columns
            If this was an editing transaction
                Mark the columns which were changed with a ©
            End if
        End if
        Move to the next row
    Next Row counter
End if

Jump to page : Button
Use the Jump form to obtain the new page to display
Change the Page variable to the returned page
Display the current page

Filter : Button
Use the filter form to obtain the filter condition
If the returned condition is a Reset condition then
    Set the recordset to the whole table
    Verify the table data and load the first page
Else
    Construct the SQL from the selected check boxes and the entered text
    Assign the SQL to the Books log's Query object and execute it
    Verify the table data and load the first page
End if

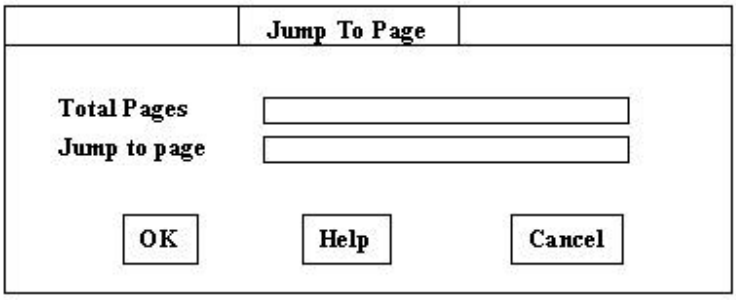
General filter form



Ok : Button
Ensure that a filter condition has been set
Hide the form

Reset : Button
Pass a reset message to the calling form in the filter form's tag property
Hide the form

Jump to page

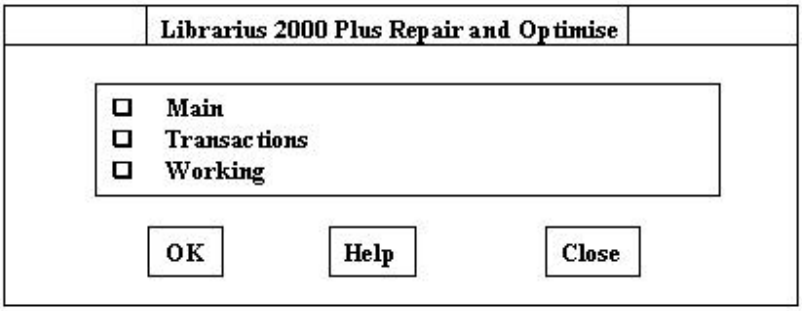


Ok : Button
Ensure that a page number has been entered and it is not 0
Hide the form

Page number (Keypress Event) : Text box
If the key is the backspace key then
    Remove the last character in the text if there is any
Else if the key is not a digit
    Generate an error
Else if adding the character to the number in the text box will result in a page greater than the available pages then generate an error
Else
    Add the character to the text in the box
End if
Cancel the keystroke to stop VB from handling it

Database Management Utilities

Repair and Optimise Form



OK : Button
If the transactions box is marked then
    Repair and optimise the transaction database
End if

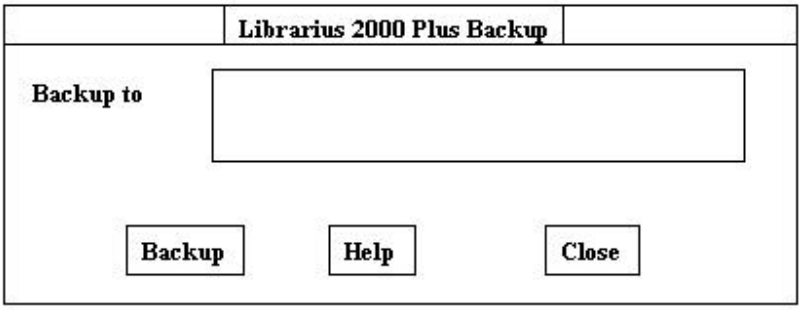
If the Main database is marked then
    Repair and Optimise the Main Database
End if

If the working database is marked then
    Delete it
End if

Repairing and optimising a database
Get the names of the working and target databases from the initialisation file
If the working database exists then
    Delete it
End if
Call the BDEngine.compactDatabase using the working database as the destination
Delete the original database
Assign the working database the name of the target database

Close : Button
End the program

Backup Form



Form Activate
Open the transactions and main database

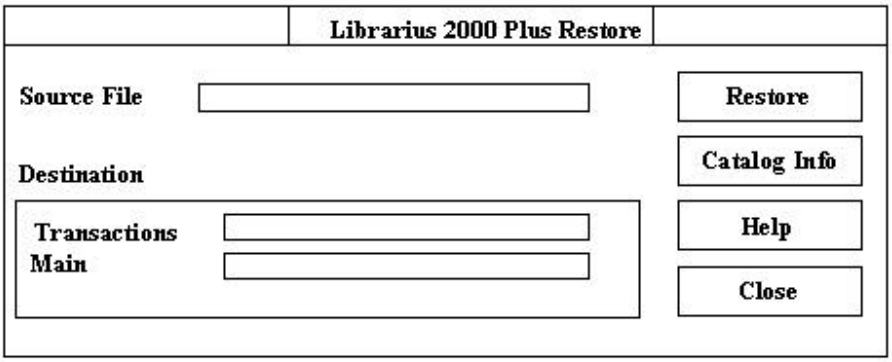
Backup Path Text Box : Click
Use the common dialog to obtain the file name
Paste the filename in the path text box

Backup : Button
If the backup path has been specified
    Confirm any pending overwrites
    Create the backup database
    Insert the following tables
        Main transaction log
        Books transaction log
        Subscriptions transaction log
        Users transaction log
        Setup table
    End insert
    Create the catalogue table
End if

Creating the Catalogue
The catalogue should be structured as follows

Identifier	**Variable**
Created	Date
Books records	Number of records : Long integer
Subscriber records	Number of records : Long integer
User Records	Number of records : Long integer
Main records	Number of records : Long integer
Finish flag	True/false :Boolean

Restore Utility Program



Catalogue Info : Button
If all the filename of the backup file has been specified then
Verify the existence of the backup table
Open the catalogue table
Paste its contents into a message box
Append an analysis of the actual data in the database
End if

Restore : Button
If all the details have been entered then
Ensure that the destinations are unique
Ensure that the destinations are different from the source file
Verify the existence of the backup table
Open the backup tables and populate the recordsets

Create the main and transaction databases
Copy the logs to the transaction databases along with the indexes
Restore the Books log
Restore the subscription log
Restore the main log
Update the database paths
End if

Restoring the Books log (Also applies to Subscriber log)

```
If the log is not empty then
        Sort the records as to time
        Move to the first record
        Repeat
                If the record is a 'New Book' transaction then
                        Add its contents to a new record to the books table
                Else if it is an 'Edit record transaction' then
                        Locate the concerned book record
                        Overwrite its contents with those in the log entry
                Else if is a 'Deregister Book' transaction then
                        Locate the book record
                        Copy its contents into a new rec in the Deregistered Books table
                        Add the deregistration details
                        Delete the books table entry
                End if
        Until all the records have been read
End if
```

Restoring the Main Log

```
If the log is not empty then
        Sort the records chronologically
        Move to the first record
        Repeat
                If it is a 'Make loan' transaction then
                        Add the record's details to the Borrowed books table
                Else if it is an ' Extend loan' transaction then
                        Locate the loan entry
                        Overwrite its details with those in the log
                Else if it a 'Return' or 'Delete loan' transaction then
                        Locate the loan entry
                        Delete it
                Else if is a 'Make requisition' transaction then
                        Add the record's details to the Requisitions table
                Else if it is an 'Extend requisition' transaction  then
                        Locate the requisition entry
                        Overwrite its details with those in the log
                Else if it is a 'Process request' or 'Delete Request' transaction then
                        Locate the requisition entry
                        Delete it
                End if
        Until all the records have been read
End if
```

Test Strategy

The system will be tested during and after development. During development, the emphasis will be on efficiency whilst the post development stage testing will focus on effectiveness. The areas of emphasis will be

- Ability to deal with normal extreme and abnormal data
- Ability to operate as integrated unit
- Ability to recover from crashes
- Ability to run on 32 bit Windows machines without Visual Basic

Testing

Introduction

For a record of the test data please see appendix 2. The test data in Appendix 2 was produced using the Report maker. A copy of the test data is in the backup database that can be found in the Librarius 2000 **Testing** subdirectory under the name **Backup.DBM**. This database once restored can be used to further verify the authenticity of the tests designed and carried out under this section. The test results may be found in Appendix 3. All the testing that involves printing has been simulated on the Adobe Acrobat PDF Writer.

Subscriptions

Tests carried out on the Members to be carried out on the Subscriptions form. The tests will focus on data entry with particular attention being given to the ability of validation routines to detect input errors. The effect of extreme and normal data will also be taken into account. The ability to save records is demonstrated by the presence of the Appendix 2 Test Data.

Test No.	Test	Expected results
1.01	**Test ability to enforce the 8 character length of the Subscriber ID.** Choose New from the Task menu and enter *12345pq* and the repeat the test with a null value.	For each instance an error should be flagged *Subscriber ID should be 8 characters long.*
1.02	**Test ability to recognise non compliance with ID pattern** . Enter *abcde123, 1234fa3c and* 12345cvb for the subscriber ID	Each letter should be flagged as an error for the first test. For the second test only the fifth and seventh characters should be flagged as errors. The third code should be accepted.
1.03	**Investigate the effect of entering a non-unique ID code.** Enter 21058prc and 98765QWE as the subscriber ID code. 21058prc belongs to a current subscriber and 98765qwe to a deregistered subscriber .	An error should be flagged, ID code has already been allocated to someone else.
1.04	**Test functionality of automatically entering the day's date in the date registered.** Press the today's date icon	Today's date should appear in the date registered column

1.05	**Test ability to recognise required input.** Date registered, Expiry date, Title, Initials, Surname and Home address left blank.	Error message *Enter [Field name]*
1.06	**Test ability to recognise optional input.** Contact Address, Contact and home phone numbers along with remark left blank.	A *(None)* should be inserted in the empty text box.
1.07	**Test borrowing limit validation range** Enter the following • Abnormal : -1, 21 • Extreme : Null, 0 and 20 • Normal : 1, 9 and 19 Valid range is 0-20	• Null should be interpreted as 0 • 0; 1; 9, 19; 20 should be accepted. • The text box should refuse to register a - sign and 21 should be rejected.
1.08	**Test borrowing fees validation range** Enter the following Abnormal : -1; 32768 Extreme : Null; 0; 32767 Normal : 1; 450; 32766 Valid Range is 0 – 32767	Null should be interpreted as 0 0; 1; 450, 32766; 32767 should be accepted. The text box should refuse to register a - sign and 32768 should be rejected.
1.09	**Test ability to validate dates.** Enter the following • Abnormal : 32/13/2101; 31/12/1799 • Extreme : 01/01/1800; 31/12/2100 • Normal : 31/02/2000; 01/01/2101 **Valid ranges** Year : 1800 – 2100 Month : 1-12 Day : 1-31	• 32/13/2101 should be recognised as invalid. • 31/02/2000 should pass the test but be adjusted to 02/03/2000. • 31/12/1799 and 01/01/2101 should be rejected as containing years outside the valid 1800 to 2100 range. • 01/01/1800; 31/12/2100 should be accepted

1.10	Enter 1/01/1999; 01/1/1999 and 01/01/99 to test the ability to enforce the dd/mm/yyyy input format.	Should be flagged as invalid date formats.
1.11	Test the ability to validate durations Enter the following values for the loan period field **Extreme** Null; 0; 00M00D; 12M31D **Abnormal** 0M0D; 9M10D; 01M2D; 31M00D; 10M32D. The input mask is xMyD where $00 \geq x \geq 12$ $00 \geq y \geq 12$	• Null should be interpreted as 00M00D. • 0; 0M0D; 9M10D; 01M2D should be detected as not being in the correct format. • 00M00D; 12M31D should be accepted 31M00D; 10M32D should be rejected as being outside the valid range.
1.12	**Testing the indexes** Set the sorting index to Subscriber ID and choose *Go to first* from the Task menu. Browse through the table using the Next button.	Expected record order 10000abc • 20000def • 21058prc • 37652xyz • 52712prs • 60000jkl • 65502gta • 70000dnh

1.13	**Test the name sorting index**	Expected record order • Gurajena T. Mrs • Mafuva T Mr • Mandoreba H R Miss • Mhiribidi S Dr • Mhiribidi S Mr • Motsi R Miss • Rusheil G H Mr • Takawira J K Prof
1.14	**Test the Expires on index**	Expected Record Order • 09/05/2000 - 21058prc • 12/05/2000 - 20000def • 25/08/2000 - 37652xyz • 06/09/2000 - 10000abc • 31/12/2000 - 65502gta • 11/07/2001 - 70000dnh • 30/09/2001 - 52712prs • 10/06/2004 - 60000jkl
1.15	**Test the Registered on index**	Expected Record Order • 10/05/1987 - 21058prc • 11/06/1999 - 60000jkl • 01/01/2000 - 65502gta • 12/02/2000 - 20000def • 06/03/2000 - 10000abc • 25/05/2000 - 37652xyz • 12/07/2000 - 70000dnh • 30/09/2000 - 52712prs

1.16	**Testing the locate function** Set the index to Subscriber ID and move to the first record. By choosing locate from the task menu, try to locate subscribers 377652xyz then 60000abc and 90000cfg	• The record for 37652xyz should be located and displayed. • For 60000abc the record for 60000jkl should be located as it appears after 60000abc. • For 90000abc, a *Match not found* message should be displayed as there is no record after where 90000abc would be and the record for 60000jkl should remain displayed.
1.17	Using the name index, search for *Mhiribidi, Karidza* and *Valencia.*	• *Mhiribidi* - Match found (Dr S.) • *Karidza* - *Mafuva* found • *Valencia.* - No matches
1.18	Using the Expires on index, search for • 25/08/2000, • 31/08/2000 • 11/06/2004.	The record for Dr S Mhiribidi should be displayed for the first search and that for Mr T Gurajena for the second since it is the first expiry date after 31/09/2000. The last search should be unsuccessful.
1.19	Using the Registered on index, search for 10/05/1987, 01/03/1988 and 01/10/2000.	For the first match the record for Miss R Motsi should be displayed and that for Miss H R Mandoreba should be displayed for the second search. The last search should be unsuccessful.
1.20	Test ability to save a new record. This test is actually carried out during the data entry process.	A test database

<table>
<tr>
<td>1.21</td>
<td colspan="2">Move to the record for Mr S Mhiribidi. Choose edit from the Task menu and change the values of the fields to the following values</td>
<td>The new field values should be recorded</td>
</tr>
<tr><td></td><td>Field</td><td>New Value</td><td></td></tr>
<tr><td></td><td>Subsc ID</td><td><No Change></td><td></td></tr>
<tr><td></td><td>Nat ID</td><td>31 147385R27</td><td></td></tr>
<tr><td></td><td>Title</td><td>Lt</td><td></td></tr>
<tr><td></td><td>Initials</td><td>P</td><td></td></tr>
<tr><td></td><td>Surname</td><td>Mhiribidi</td><td></td></tr>
<tr><td></td><td>Registered On</td><td>01/06/1999</td><td></td></tr>
<tr><td></td><td>Expires on</td><td>31/05/2000</td><td></td></tr>
<tr><td></td><td>Remark</td><td>Invoice 239/1999</td><td></td></tr>
<tr><td></td><td>Borrowing fee</td><td>700</td><td></td></tr>
<tr><td></td><td>Borrowing limit</td><td>6</td><td></td></tr>
<tr><td></td><td>Loan duration</td><td>03M21D</td><td></td></tr>
<tr><td></td><td>Home Add</td><td>A. F. Z.
Thornhill Air Base
23 Marital Qt
Gweru</td><td></td></tr>
<tr><td></td><td>Home phone</td><td>054 52278</td><td></td></tr>
<tr><td></td><td>Contact Address</td><td>1 Hume Av
Southdowns
Gweru</td><td></td></tr>
<tr><td></td><td>Contact phone</td><td>054 52725</td><td></td></tr>
</table>

Books Form

Test No.	Test	Expected Results
2.01	**Testing Ability to obtain free number** Choose New and click the # button to obtain a free number.	The first unused number 11 should be inserted in the book number text box. Note that 7 belongs to a deregistered book.
2.02	**Testing ability to enforce uniqueness of ID with registered books** Change the book number to 8 and choose save.	An error *This book number has been allocated to another book* should be raised.
2.03	**Testing ability to enforce uniqueness of ID with deregistered books** Change the book number to 56, which belongs to a deregistered book.	An error *This book number has been allocated to another book* should be raised.
2.04	**Test range of Book number** Change the book number to 0; 2147483647 and 2147483648 Choosing save after each change.	• 0 should be rejected as being outside the valid range. • 2147483647 should be accepted. • The system should block the entry of 2147483648 or range grounds.
2.05	**Test ability to recognise required fields** Leave the title, author, library class, Dewey, ISBN, and Publisher blank	Error message *Enter* [Field name]
2.06	**Test ability to recognise optional fields** Pad the fields in 5 with valid data and leave the Remark and supplier fields blank. Choose Save.	A *'(None)*' should be inserted into the blank fields

2.07	Borrowing fees of Null; -1; 0; 1; 450; 32766; 32767; 32768	Null should be interpreted as 0 0; 1; 450, 32766; 32767 should be accepted. The text box should refuse to register a - sign and 32768 should be rejected.
2.08	Test ability to recognise dates. Use 32/13/2101; 31/02/2000; 31/12/1799 and 01/01/2101.	32/13/2101 should be recognised as invalid. 31/02/2000 should pass the test but be adjusted to 02/03/2000. 31/12/1799 and 01/01/2101 should be rejected as containing years outside the valid 1800 to 2100 range.
2.09	Enter 1/01/1999; 01/1/1999 and 01/01/99 to test the ability to enforce the dd/mm/yyyy input format.	Should be flagged as invalid date formats.
2.10	Enter the following values for the loan period field Null; 0; 0M0D; 9M10D; 01M2D; 00M00D; 12M31D; 31M00D; 10M32D. The input mask is xMyD where $00 \geq x \geq 12$ $00 \geq y \geq 12$	Null should be interpreted as 00M00D. 0; 0M0D; 9M10D; 01M2D should be detected as not being in the correct format. 00M00D; 12M31D should be accepted and 31M00D; 10M32D should be rejected as being outside the valid range.

<table>
<tr><td>2.11</td><td colspan="2">Press the today's date icon</td><td>Today's date should appear in the date registered column</td></tr>
<tr><td rowspan="15">2.12</td><td colspan="2">Move to the record for book number 15 and change the field values to the ones shown below.</td><td rowspan="15">The field values should be updated.</td></tr>
<tr><td>Field</td><td>New Value</td></tr>
<tr><td>Title</td><td>The Inorganic</td></tr>
<tr><td>Author</td><td>Liprakas C K</td></tr>
<tr><td>Reg</td><td>02/02/1991</td></tr>
<tr><td>Borr. Fee</td><td>350</td></tr>
<tr><td>Loan Period</td><td>01M14D</td></tr>
<tr><td>Class</td><td>Sci-Fiction</td></tr>
<tr><td>Dewey</td><td>325</td></tr>
<tr><td>ISBN</td><td>0325 505204</td></tr>
<tr><td>Publisher</td><td>Stanelys</td></tr>
<tr><td>Publisher</td><td>Tasham Bks</td></tr>
<tr><td>Loanable</td><td>No</td></tr>
<tr><td>Remark</td><td>Donation- Drama club</td></tr>
<tr><td>2.13</td><td colspan="2">Set the index to a book number index and choose Go to first from the Task menu. Use the next button to browse through all the records</td><td>Expected order
1; 2; 3; 4; 5; 6; 8; 9; 10; 12; 15; 17; 37</td></tr>
</table>

2.14	Choose move to first, Locate and try the book numbers 7; 12 and 38	For 7, the first book after 7 i.e. 8 should be displayed. For the second search the record for 12 should be displayed. 38 should result in a match not found message.
2.15	Set the index to Title index and browse as in 2.13	Expected order Aquifers (5) English Etiquette (3) Evolution (10) ExponentialFunctions{8} Galaxies near us (9) Immunity (6) International trade (4) International Trade : Qtns (37) Relativity (2) Revelations (1) Small Orange (12) The art of war (17) The inorganic (15)
2.16	Choose move to first and try to locate *M, English Etiquette* and *Volcano*	1st - Relativity (2) 2nd - Match found 3rd - No match found
2.17	Set the index to the Author index and browse as in 2.13	Expected order Andrakatta (2) Camelot (1) Clarista (12) Gatak (4) Gatak (37) Laraka (3) Liprakas (15) Malakov (8) Peter (9) Picard (17) Rabin (6) Waugh (5) Zivanai (10)

2.19	Using the author index try to locate Picard; L and Zororai.	Picard - Found L - Laraka found Zororai - Match not found
2.20	Set the Index to the Dewey index and browse as in 2.13	Expected order 100 (4) ; 100 (37) 300 (6) ; 300 (12) 325 (15) ; 400 (10) 500 (8) ; 600 (3) 700 (5) ; 750 (17) 800 (2) ; 900 (9)
2.21	Using the Dewey index search for 300;7720 and 901.	1 - Match found (6) 2 - Match found (750-17) 3 - Match not found
2.22	Set the index to the Registered on index and browse as in 2.14	Expected order 25/08/1979 (6) 23/03/1981 (5) 01/01/1982 (1) 01/01/1982 (4) 01/01/1982 (9) 28/02/1982 (37) 17/05/1983 (10) 23/07/1983 (8) 10/05/1987 (3) 22/10/1987 (17) 02/02/1991 (15) 12/09/1991 (2) 31/08/1992 (12)
2.23	Using the registered on index, search for 28/02/1982; 01/05/1987 and 01/01/1993	1st -Record found (37) 2nd -Record for 3 found 3rd -Book not found

2.24	Set the index to Class and browse as in 2.13	Expected order Astronomy (9) Biography (17) Customs (3) Divinity (1) Economics (4) Economics (37) Fiction (12) Geology (5) History (10) Maths (8) Physics (2) Sci-Fiction (15) Zoology (6)
2.25	Using the class index search for Economics; I and Zoomantics	1 - Match found 2 - Match found (8) 3 - Match not found

Loan and requisition testing

Test No.	Test	Expected Results
3.01	Loan book to a non-existent subscriber by entering ID 12345abc and pressing enter	Error message *Subscriber non-existent*
3.02	Try to leave subscriber ID text box blank	Error message *Enter subscriber ID*
3.03	Enter subscriber ID *W234TT67* which does not obey the input mask of DDDDDLLL	Error message The first, fifth and sixth characters should be identified as invalid.
3.04	Enter valid Subscriber ID. 37652xyz	The subscriber details should be pasted into the subscriber ID text box.
3.05	Try to loan out a book classified as not loanable to 37652xyz by entering 10 in the book number text box.	Error message *This book is classified as not loanable.*
3.06	Check ability to enter the correct title and author into the respective text boxes by entering 5 in the book umber text box and pressing enter.	The title *Aquifers* and the author *Waugh D* should appear in the text boxes along with the fixed cost of $7 in the cost text box.
3.07	Check on ability to record a loan by confirming the loan in test 3.06 by pressing Enter. The loan period is fixed at 01M04D.	The books borrowed table should have the following entry added Date Borr 18/09/2000 Bk number 5 Subsc 37652XYZ Date due 22/10/200

3.08	Using the Setup facility, set the determination of loan period to *Membership* and cost determination to book. Loan out book no. 3 to 37652xyz. Loan period is 01M14D	The following entry should be entered Date Borr 18/09/2000 Bk number 3 Subsc 37652XYZ Date due 01/11/200 $3.50 should be added to the cost to make it $10.50
3.09	Loan period as to : Bk Cost of Borr :Mem Loan out bk 6 to 37652xyz Loan period is 00M21D	The following entry should be entered Date Borr 18/09/2000 Bk number 6 Subsc 37652XYZ Date due 09/10/2000 $2.00 should be added to the cost to make it $12.50
3.10	Loan period as to : Bk Cost of Borr : Mem+Bk Loan out bk 2 to 37652xyz Loan period is 00M28D	The following entry should be entered Date Borr 18/09/2000 Bk number 2 Subsc 37652XYZ Date due 16/10/2000 Cost added- $3.75+$2.00 New total - $18.25
3.11	Try to loan out books number 17; 12 and 3 to 37652xyz. Book number 3 has already been loaned out to 37652xyz.	Book 17 & 12 should be loaned out without a problem. Book number 3 should result in an error "This book has already been loaned out"
3.12	Test ability to recognise borrowing limits by trying to loan out books number 8 and 9. Borrowing limits are fixed at 7 and the 37652xz already has 6 books on loan.	Book number 8 should be loaned out without a problem. Book number 9 should result in an error *Subscriber limit reached.*
3.13	Choose *New* and then try to loan out book number 9 to 20000def who has an expired subscription.	Error message "Subscription has expired"
3.14	Attempt to loan out a non existent book number 23 to 60000jkl.	Error message *Book non-existent*

3.15	Loan out books number 9; 4 and 1 to 60000JKL for the purpose of analysing the effect of including more than one subscriber in the table	The entries should be added to the loans table.
3.16	Test the effect of trying to request a non-existent book Subsc - 60000JKL Bk - 72	Error message *There is no book with book number 72.*
3.17	Test the effect of trying to request a book not on loan. Subsc - 60000JKL Bk - 15	Error message *This book has not been loaned out.*
3.18	With a request valid for period of 00M07D, test ability to record requests by entering the following requests 60000JKL - 6; 3 70000DNH -9;17 37652xyz -1;4	The requests should be entered into the requests table with the following expiry dates 6–16/10/2000; 3–8/11/2000; 9–9/10/2000; 17–25/11/2000; 1–15/11/2000; 4-15/11/2000;
3.19	With a fixed requisition limit of 2 test the recognition of the limit by having 60000JKL request book number 2	Error message *Requisition limit reached*
3.20	Test the effect of requesting a book already requested by someone else Subscriber - 37652xyz Bk - 9	Error message *This book has already been requested by someone else.*
3.21	Test the effect of having a subscriber request a book he has already requested Subscriber - 70000DNH Bk - 17	Error message *This subscriber has already requested this book.*
3.22	Test the effect of having a subscriber request a book he already has on loan Subscriber - 37652xyz Bk - 3	Error message *This subscriber already has this book on loan.*
3.23	Test the effect of trying to return a book on record as being on loan to someone else. Subscriber - 37652xyz Bk - 4 On loan to 60000JKL	Error message *This book was actually loaned out to Miss H R Mandoreba (60000JKL)*

3.24	Test the effect of trying to return a book on record as not being on loan Subscriber - 37652xyz Bk - 37	Error message *This book has not been loaned out.*
3.25	Test the effect of returning a book on request Subscriber - 60000JKL Bks - 1 & 4	1 & 4 should be added to the *Requested* text box.
3.26	Test the effect of borrowing books which you had earlier requested by having 37652xyz return book number 6 to make space for another loan and then borrow 4 which he has on request.	The requisition entry for book number 4 should be deleted from the Request table and a loan entry made in the Book borrowed table.
3.27	With a fine of $2.78 per day, test the effect of returning an overdue book by simulation a 24 day period using the Windows' Control panel and then having 37652xyz return books number 8 and 12.	In the subscriber details text box, the following data is expected. On loan-7{5;3;2;17;12;8;4} Overdue - 2{12 & 8} Requests - 1 Expired - 0 A fine of $47.26 (17 *2.78) for 8. A fine of $27.80 should be added for book number 12 to make the total fine $75.06

3.28	Test the ability to determine subscription limits given various Setup settings. ➢ Set the fixed limit to 7 and enter subscriber ID 60000JKL. ➢ Change the determination to membership and refresh the subscription details. ➢ Change the determination to Fixed less requested and refresh the details. ➢ Change the determination to membership less requests. Refresh the subscription details.	The following limits should appear in the details box. The limit is given by (Borrowed + Can Borrow) Fixed : 7 Membership : 12 Fixed - Req : 7-2 = 5 Memb- Req :12-2 =10
3.29	Investigate the effect of a Fix - Req or Memb - Req which results in a negative amount by setting the fixed limit to 0 using 70000DNH	Fix-Req = 0 - 2 = -2 Memb-Req = 1-2 = -1 0 should be displayed and a warning message displayed.

Search Testing

Test No.	Test	Expected Results
4.01	Search on - Subscriber ID Search str - 65502gta Type -Whole word	Mr G H Rusheil
4.02	Search on - Subscriber ID Search str - 10 Type -Embedded	21058prc 10000abc
4.03	Search on - Surname Search str - Mhiribidi Type -Whole word	20000def - Lt P 37652xyz - Dr S
4.04	Search on - Surname Search str - ma Type -Embedded	60000JKL - Mandoreba 70000DNH - Mafuva
4.05	Search on - S. Title Search str - Mr Type -Whole word	70000dnh - Mr Mafuva 65502gta - Mr Rusheil
4.06	Search on - S. Title Search str - ro Type -Embedded	52712prs Prof J K Takawira
4.07	Search on - S. Initials Search str - T Type -Whole word	70000dnh - T Mafuva 10000abc - T Gurajena
4.08	Search on - S. Initials Search str - H Type -Embedded	60000jkl - H Mandoreba 65502gta - G H Rusheil
4.09	Search on - Bk Number Search str - 8 Type - Whole word	Exponential Functions
4.10	Search on - Bk Number Search str - 1 Type -Embedded	1; 10; 12; 15 & 17

4.11	Search on - Bk Title Search str - International Trade Type -Whole word	4
4.12	Search on - Bk title Search str - of Type - Embedded	The art of war (17) Relativity; Theory of (2)
4.13	Search on - Book author Search str - Waugh D Type -Whole word	Aquifers (5)
4.14	Search on - Book author Search str - Dr Type -Embedded	Malakov P; Dr Laraka D; Dr An**dr**akatta
4.15	Test the effect of not having a match during a whole word search Search on - Subscriber ID Search str - 92937Cal Type -Whole word	Error message *Match not found*
4.16	Test the effect of not having a match during an embedded string search Search on - Book Title Search str - zgs Type -Embedded	Error message *Match not found*
4.17	Test results window ability to save results in text format. Repeat test 4.09 and choose Save from the File menu on the results window's Task menu. Save the file as test409.Res and open it in notepad	The file should appear as saved. Alignment problems are expected due to differences in font sizes.
4.18	Test ability to print results using the data displayed in test 4.17	

Loan, requisition, subscription and book records

The requisition and loan data management share the same code therefore only the results from the loan data tests will be presented. The requisition management will however also be tested.

Preparations

The following conditions will need to be recreated

1. Reset the borrowing limit to 8 (Fixed).
2. Reset date to 19/09/2000.
3. Loan out 8 & 37 to 37652xyz.

Tests

Test No.	Test	Expected Results
5.01	Test ability to display loan data by using the subscribers window and moving to the record for 37652xyz.	A form displaying the loan entries to 37652xyz
5.02	Test ability to extend loan period by adding 1 month and 3 days to book number 5's due date.	The due date should be changed to 25/11/2000
5.03	Test ability to reduce the loan period by subtracting 20 days to the due date for book number 3.	The due date should change to 12/10/2000
5.04	Try setting the due date to the date borrowed. Use book number 2.	The update should be successful
5.05	Try setting the due date to a date before the date borrowed. Use book number 2.	Error message *You cannot set the due date to a date before the date borrowed*
5.06	Test ability to delete loan by deleting the loan concerning book number 17	The pages should be adjusted and the entry removed.
5.07	Test the effect of trying to deregister a subscriber with books on loan. Use 60000JKL	Error message *This subscriber book(s) on loan. Cancel the loans first.*
5.08	Test the effect of trying to deregister a subscriber with books on request.	Error message *This subscriber book(s) on request.*

	Use 70000dnh	*Cancel the requisitions first.*
5.09	Test the effect of trying to deregister a book on loan. Use 5.	Error message *This book is on loan. Cancel the loan first.*
5.10	Test the effect of trying to deregister a book on request. Use 17.	Error message *This book is on request. Cancel the requisition first.*
5.11	Test ability to deregister subscribers ID :21058prc Reason :Expired Remark :Ref 25/08/1982 ID :52712prs Reason :Cancelled Remark :Ref 27/05/1982	The data should appear in the deregistered subscribers table.
5.12	Test ability to deregister books Bk no. : 10 Reason : Lost Remark : 37652xyz Bk no. : 15 Reason : Damaged Remark : 70000dnh Replaced with 17	The data should appear in the deregistered book table.

Transaction testing

Test 6.01 : Test User log maintenance

User	Name	Password
User 1	Motsi T	Tino
User 2	Mafuva G	Gerald
User 3	Zvidzai T	Tatenda

Testing procedure

1. User 1 enters the security manager and gives the other 2 users full access.
2. Each user will then access the main areas in the following order
   - Main module
   - Transactions
   - Report Maker
   - Query
   - Backup

Expected results

The log should be prepared showing all the above logging ins in the order given above.

Test 6.02: Test subscriber log maintenance

Procedure

1. Enter new subscriber 12345abc
2. Open the record for editing but save it without changes
3. Open the record for editing 14 times. On each opening, edit one of the following fields in the order given below and save.
    - National ID
    - Title
    - Initials
    - Surname
    - Registered on
    - Expires on
    - Borrowing fee
    - Borrowing limit
    - Loan duration
    - Home address
    - Home phone number
    - Contact Address
    - Contact phone number
    - Remark
4. Open the record for editing and edit all the fields
5. Deregister the subscriber specifying *Cancelled* as the reason and *Ref 25/10/200* as the remark

Expected Results

The transaction log should register all the transactions. For each editing transaction, the fields changed should be marked. For the deregistration transaction, the deregistration remark should be entered in the remark field, the reason in the Reason field. No other entries should be made.

Test 6.03 : Test books log maintenance

Procedure

1. Enter new book 2507
2. Open the record for editing but save it without changes
3. Open the record for editing 12 times. On each opening, edit one of the following fields in the order given below and save.
   - Title
   - Author
   - Date registered
   - Borrowing fee
   - Loan Period
   - Loanable
   - Library Class
   - Dewey number
   - ISBN
   - Publisher
   - Supplier
   - Remark
4. Open the record for editing and edit all the fields
5. Deregister the book specifying *Sold* as the reason and *Receipt 1234/2000* as the remark

Expected Results

The transaction log should register all the transactions. For each editing transaction, the fields changed should be marked. For the deregistration transaction, the deregistration remark should be entered in the remark field, the reason in the Reason field. No other entries should be made.

Test 6.04 : Main Log maintenance

Procedure

1. Create subscribers 12345jkl and 78965pqr
2. Create books 270 and 513
3. Loan out 513 and 270 to 12345jkl at a fixed cost of $2.50 and loan period of 00M14D
4. 78965pqr requests 513 and 270 at a fixed period of 7 days
5. Extend the loan 12345jkl ; 513 by 13 days
6. Reduce the loan 12345jkl ; 270 by 12 days
7. Extend the requisition 78965pqr ; 513 by 3 days
8. Reduce the requisition 78965pqr ; 270 by 2 days
9. Delete the loan 12345jkl ; 513
10. Delete the request for 513
11. 12345jkl returns 270
12. 78965pqr borrows 270 (Request processing)

Expected Log Entries

Date	Type	Bk Number	Subsc ID	Extra Date	Amount
18/09/2000	Borrow	513	12345jkl	02/10/2000	2.50
18/09/2000	Borrow	270	12345jkl	02/10/2000	2.50
18/09/2000	Request	513	78965pqr	09/10/2000	
18/09/2000	Request	270	78965pqr	09/10/2000	
18/09/2000	Ext Loan	513	12345jkl	15/10/2000	+13
18/09/2000	Ext Loan	270	12345jkl	20/09/2000	-12
18/09/2000	Ext Request	513	78965pqr	12/10/2000	+3
18/09/2000	Ext Request	270	78965pqr	07/10/2000	-2
18/09/2000	Del Loan	513	12345jkl		
18/09/2000	Del Request	513	78965pqr		
18/09/2000	Return	270	12345jkl	20/09/2000	
18/09/2000	Req Process	270	78965pqr	07/10/2000	
18/09/2000	Borrow	270	78965pqr	02/10/2000	2.50

The query utility

To test the SQL utility, two queries will be executed each dealing with a table from one f the two databases. The query results will be compared with those obtained by Microsoft Access.

Test 7.01 : Query on the Main Database

A query to display the details of all the subscribers with expired subscriptions.

```
SELECT *
FROM [Subscriber Table]
WHERE [Expiry Date] > #20/08/2000#
```

Test 7.02: Query on the Transactions Database

A query to display the User's log's 10 - 20 sessions

```
SELECT *
FROM [User's log]
WHERE [Session] >= 10 and [Session] <= 20
ORDER BY [Session]
```

The Report Utility

Test 8.01 : Mail merge

Procedure

1. Start report maker and specify a merge session
2. Load a SQL source filewith the following contents

   *SELECT **
   FROM [Subscriber Table]
   WHERE [Expiry Date] < #30/09/2000#

3. Enter the merge source text

   {Subscriber title} {Initials} {Surname}
   {Home address}

   1 October 2000

   Dear {Subscriber title} {Surname}

   RE: RENEWAL OF SUBSCRIPTION

   This letter serves to inform you that you subscription expired on {Expiry date} and that if it is not renewed by 10 October 2000 it will be terminated.

   Your Sincerely

   _____
   Motsi Tinovimba G
   Head Librarian

4. Run the merge

Expected Results

Each of the subscribers with an expired subscription should receive a personalised letter.

Test 8.02 : The Report Builder

Procedure

1. Start report maker and request a Report session
2. Load the SQL file made in 7.02
3. Choose all the fields and trim none
4. Build the report

Expected Results

The report should be printed as the records appear in the query.

NB: Please also study the reports in Test Data appendix.

User Privileges

Test 9.01

Procedure
Initialise all access rights to no access
For each access centre
    Ensure that access is denied
    Enable access
    Ensure that access is now granted
Next

Calendar Utility

Test 10.01

1. Generate the following calendar months using Microsoft Windows' Adjust Date/Time utility
    - Jan 1980
    - Feb 1981
    - Feb 1982
    - Mar 1983
    - Apr 1984
    - May 1985
    - Jun 1986
    - July 1987
    - Aug 1988
    - Sept 1989
    - Oct 1990
    - Nov 1991
    - Dec 1992
2. Use the Calendar utility to display each month
3. Compare the two

Backup and Restore

Test 11.01

Procedure

1. Print all the tables in the databases after carrying out all the above tests
2. Backup the databases
3. Delete the original databases
4. Restore the databases to a different location to ensure that the initialisation file is being updated properly
5. Print the new Database tables

Expected results

The backup should be restored to its previous state with the only addition being in the form of a transaction inserted to indicate the date of restoration in the user's log.

Repair

Test 12.01

The ability to perform this test hinges on my ability to corrupt a Libra database. Unfortunately I have so far been unable to do this despite trying to reset the computer during reads, writes etc.

User Manual

Chapter 1: Getting Started

System Requirements

To satisfactorily install and run Librarius 2000 Plus, you will need

1. A computer running Windows 95, 98 or 2000.
2. A wide printer for printing reports and the paper to go with it.
3. 3MB of free hard disk space for the program.
4. Space for the databases as advised by your vendor.

Installing the System

To install Librarius 2000 Plus

1. Close any programs you may be running. To minimise the risk of complications, restart your computer first.
2. If you obtained the installation program from the website then
   - Extract the zip file using WinZip to a folder of your choice
   - Click on My Computer on your Desktop and select the folder with the unzipped files
   - Double click 'Setup.exe'
3. If you have the program on disks then
   - Insert the diskette labelled Librarius 2000 Plus Installation disk 1 in Drive A.
   - From the Start menu, choose Run.
   - Type in 'A:\Setup' and press Enter.
4. Follow the instructions that will be displayed on the screen.
5. Some machines will record an error when it comes to registering '**msjro.dll**'. If this comes up, simply choose ignore.
6. Once you have successfully installed Librarius 2000 Plus, you **MUST** initialise the database as shown below before running Librarius 2000 Plus or any of its utilities.

Initialising the databases

To initialise the databases, you must run the Database Initialisation Utility whose icon will be in the Librarius 2000 Plus group.

1. Start up the initialisation wizard by choosing it from the Librarius 2000 program group in the start menu. If you start it properly you should be greeted by the welcome screen.
2. In the 'Enter Password Window', enter your Product ID password. You will find this password on the last page of this User Manual.
3. The wizard has 8 Steps that are detailed below. After you have successfully entered your Product Password, choose the Next button after reading the introduction.

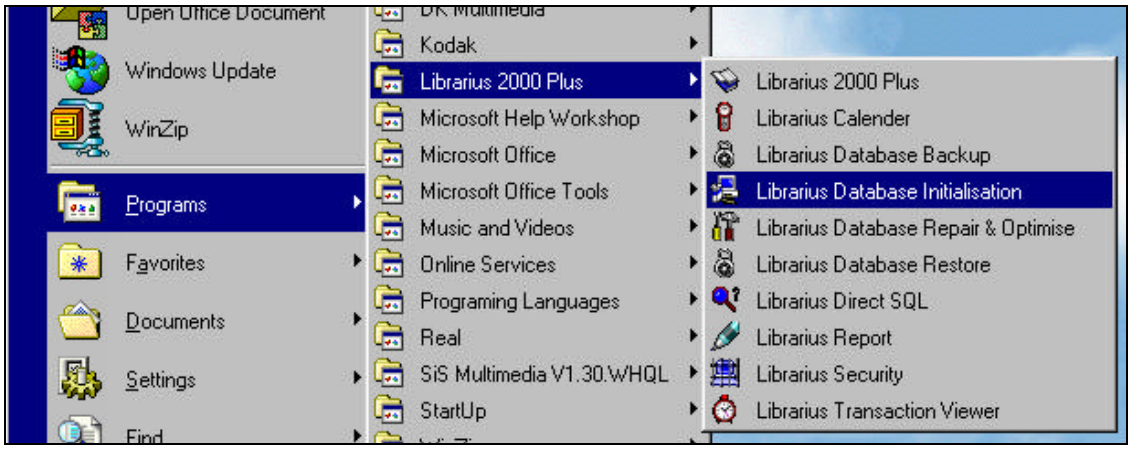


Figure 1: The Librarius Program Group

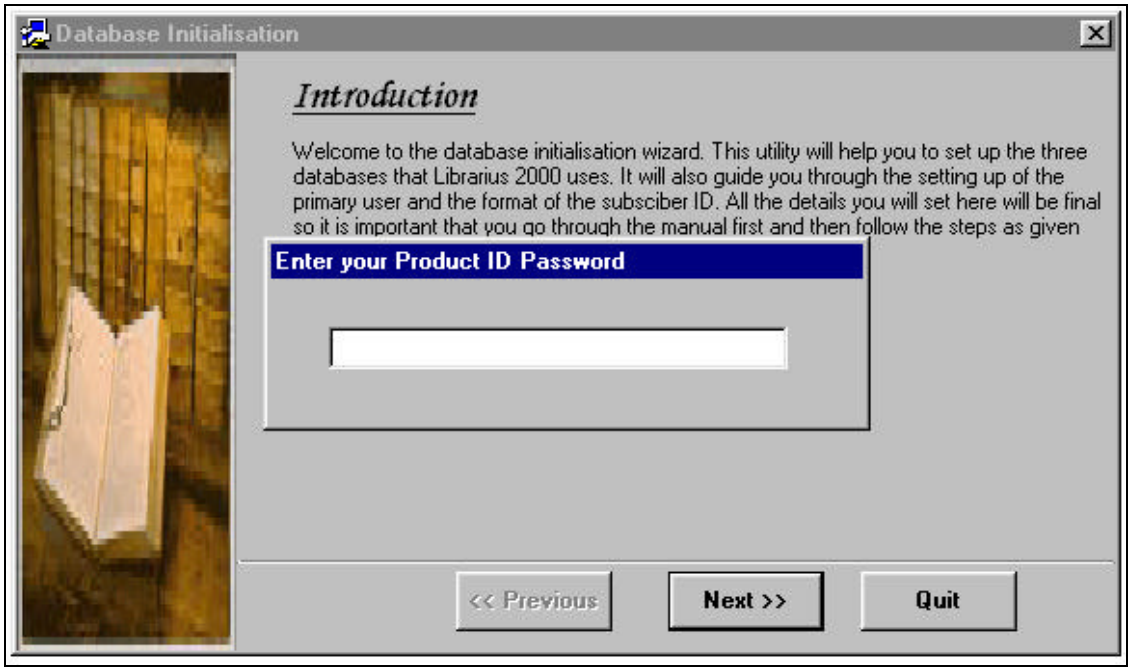

Database Initialisation
Introduction
Welcome to the database initialisation wizard. This utility will help you to set up the three databases that Librarius 2000 uses. It will also guide you through the setting up of the primary user and the format of the subsciber ID. All the details you will set here will be final so it is important that you go through the manual first and then follow the steps as given
Enter your Product ID Password
<< Previous
Next >>
Quit

Figure 2: Database Initialisation Welcome Window

4. For Step 1, you must specify the name of the individual or organisation that you would like Librarius to record as the registered owner. This name would usually be the name of your parent organisation or Library whichever is more appropriate. Once you specify this name, you will not be able to change it without deleting your databases and starting all over again so you should make sure that you enter it correctly. The name can be up to 30 characters. A character is any letter, digit or symbol you can type including the 'space'.
5. For Step 2 you must specify the profile of the primary user who will be referred to after this as User1. Enter the name and then the password you would like to assign this user twice in the two spaces provided. These may each be up to 30 characters.

User1 will not be restricted by the system in any way and will be responsible for administrating the access privileges of the other two users so it is vital that this password be known by User1 alone. You may change both later provided you know the current User 1 Password.

If you forget this password you will not be able to gain access to your databases with unlimited access as User 1 through Librarius 2000 Plus again as you will need to know the current User1 password before changing it.

6. For Step 3, you must specify the location of the main Librarius database. The databases will most likely all grow to quite a substantial size so you must choose a location that will have a substantial amount of space. This space requirement will vary from one user to another so please consult your program vendor. To specify the filename, click on the white box. A typical 'Save Window' should then appear. Enter the name of the databases and then choose Save. Choose 'Next' to go to the next step.

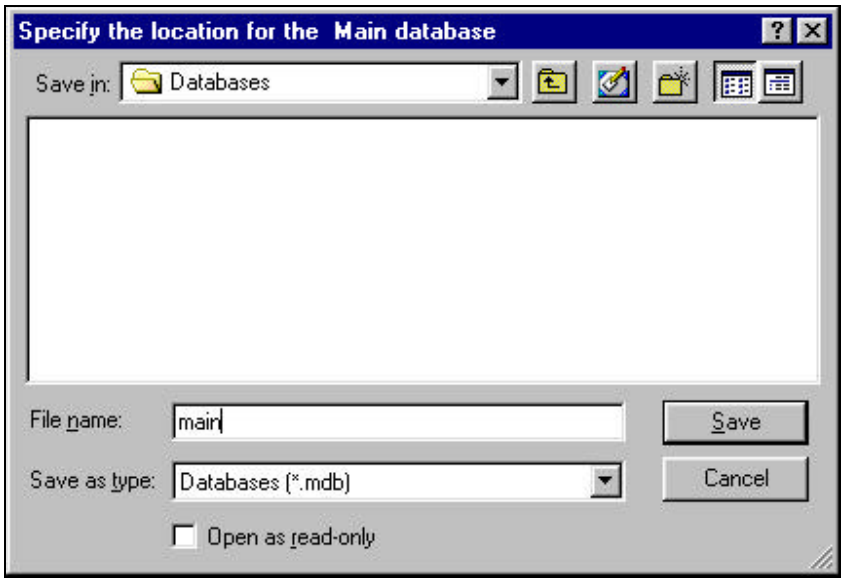


Figure 3: Typical Save Window

7. For Step 4 and 5, you will be required to specify the location and name of the other two databases using the same procedure. The same considerations apply with the only notable addition being that **no two databases may be given the same name**.
8. In Librarius 2000, all subscription numbers are referred to as Subscription IDs and must be 8 characters long and obey the Subscription ID mask. Once you have specified the mask, you will not be in a position to change it in any way. If you want the character in a certain position to be a letter then enter an 'L' in that position in the pattern; otherwise enter a 'D'.

For example, DDLDLLLD would specify a pattern where

- The first two characters would be digits
- Followed by a letter,
- Followed by a digit
- Followed by three letters
- With a digit at the end

It is worthwhile having a pattern that means something. For example, you can have a pattern of three letters followed by 5 digits where the 5 digits represent a subscription code and the 3 letters represent the type of membership the subscriber has.

9. Step 7, gives you an opportunity to review your entries before committing them. To view all the entries specified save for the password that, click on the white box labelled 'CURRENT SPECIFICATION'. To change anything, click on back until you come to the step. You will not be forced to renter anything correct you will have entered before. If you are satisfied with the entries then choose 'Finish'.
10. If your Database Initialisation is successful, you will be shown the window below. After initialising your databases, you must customise your system by defining your library policies. See the section 'Customising Your System' after this for more details.

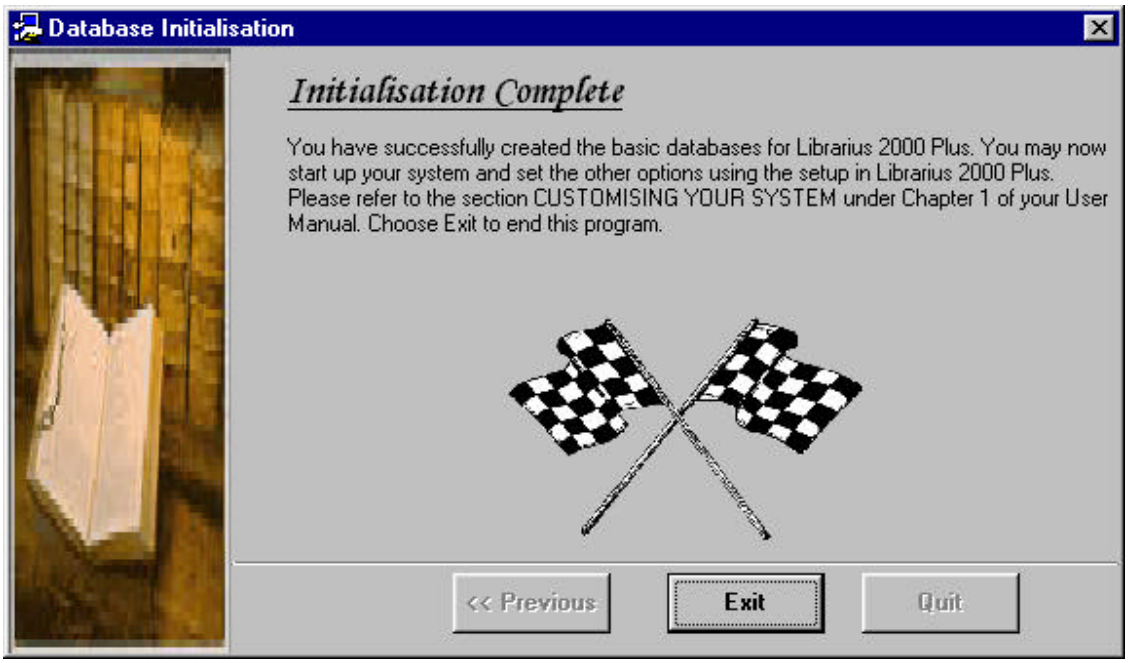

Database Initialisation
Initialisation Complete
You have successfully created the basic databases for Librarius 2000 Plus. You may now start up your system and set the other options using the setup in Librarius 2000 Plus. Please refer to the section CUSTOMISING YOUR SYSTEM under Chapter 1 of your User Manual. Choose Exit to end this program.
<< Previous
Exit
Quit

Figure 4: Successful Initialisation

Customising Your System

Before you begin using Librarius 2000, you will need to specify certain things to customise your system. You may also revisit this section later to change any of the settings you will have specified. To do this start Librarius 2000 and from its program window and then enter your high priority access password when you are prompted to do so. The bar shown below will then appear at the top of your screen.

Librarius 2000 Plus
Task Database Tools Help
Licensed to : University of Zimbabwe
Time : 18 25 hrs
Date : Saturday 20 April 2002
User 1 : Motsi Tinovimba G

Figure 5: Main Librarius Window

From the 'Tools' menu on this bar, choose 'Options' and you will be presented with the following window.

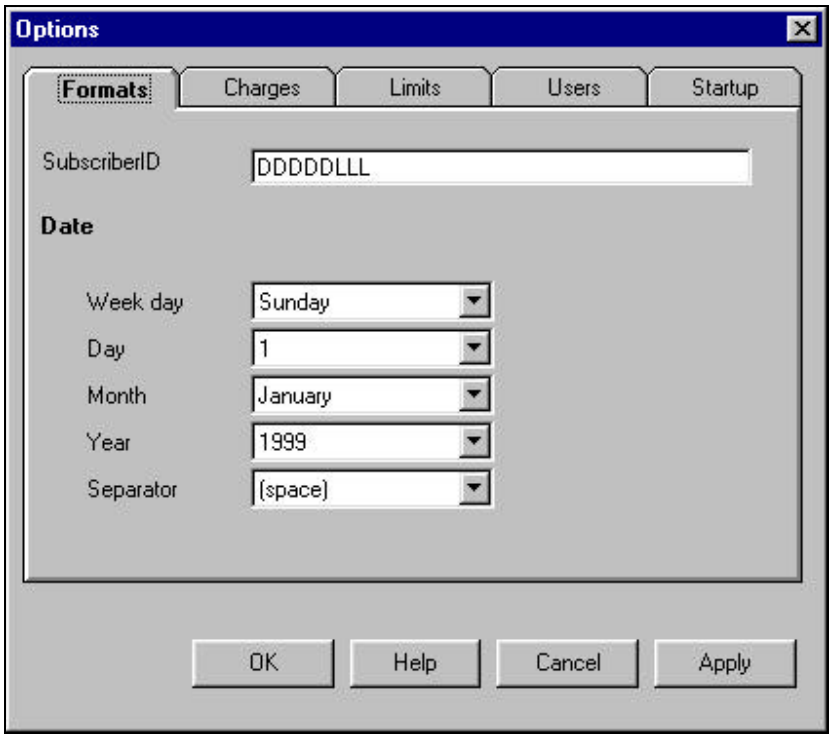


Figure 6: Options Window

Setup is divided into 5 categories namely

- Formats
- Charges
- Limits
- Users
- Start up

To access any particular category, click the tab that will be bearing its title.

The Formats Category

1. Subscriber ID

The subscriber ID textbox is used to show the system's subscription ID mask. This property cannot be edited.

2. Dates

Librarius allows you to specify how dates should be displayed by the system. We may consider a date like Monday 31 July 2000 to be made up of

- Monday the weekday
- 31 the day
- July the month
- 2000 the year.

To specify a particular formatting for any given element of the date, choose from the samples that will be shown when you click on the downward facing arrows alongside its title. The formatting options are as follows:

a) For the weekday you can choose to
   - Omit it
   - Display it in its shortened form (e.g. Mon)
   - Display it in full (e.g. Monday)

b) The day can be displayed with or without leading zeros. If you choose to display the day with leading zeros, your day will always be two digits long implying that the days 1 to 9 will be displayed prefixed with a zero.

c) The month can be displayed as
   - A full month (e.g. January)
   - In its shortened form (Jan)
   - As a number with a leading zero where necessary
   - As a number with leading zeros

d) The year can be displayed either as a 4-digit year or as a 2-digit year.

e) You have a choice of separators and these are
   - /
   - –
   - A space.

Using the above, you should be able to specify any date format that you may wish. You however do not have a choice as far as the order is concerned. The order is Week day, if present, followed by the day, month and year separated by the specified separators.

The Charges Category

1. Borrowing fee

When you loan out books you may choose to charge the borrowers for each loan made and Librarius 2000 Plus gives you 4 charging options.

The first one is a universal charge referred to as the fixed charge. This charging system is appropriate where all loans are made to all the subscribers at the same fee. If you choose this charging option then you must specify the universal charge in the box labelled 'Fixed charge'.

The second option which charges books as to membership schemes is appropriate where the library has more than one membership scheme where the borrowing fees vary as to the type of loaning scheme you will be on. If you choose this option then you should specify the amount the subscriber will be charged in his or her subscription record. See the section 'Managing subscription records' that appears in Chapter 2 for more information.

The third option charge books as to the type of book and is appropriate where the library loans out different books at different fees. If you choose this option then you should specify the amount the borrower subscriber would be charged in the book's record. For more information on this, see the section 'Managing book records' in Chapter 2.

The fourth option allows you to combine the subscription and books charging options. It is appropriate where fees are as to the type of book but a certain subscriber or group of subscribers is require to pay an extra fee for each loan made. The other possible scenario is where the basic system is as to membership schemes but subscribers are required to pay an extra fee if they wish to borrow a particular book that may be on loan from another library, new or under high demand.

2. Fine per day

Use this option to specify the fine you wish to charge for each day a book will be overdue by.

The Limits Category

The limits category allows you to specify 7 loan and requisition settings.

1. Borrowing limit as to

Use this to specify whether the borrowing limits will

- Be fixed e.g. 5 books for each and every subscriber
- Vary as to membership schemes e.g. Mr Motsi has a borrowing limit of 6 whilst Mr Mutasa has a borrowing limit of 2. The borrowing limits must be specified in the individual subscriber's records.
- Fixed less the number of requests e.g. a subscriber can only have 7 books on both loan and request.

If you select this option, it is advisable to also set the requisition limit to 'Fixed less Borrowed' and to specify the same fixed limit for both requests and loans.

- Membership less requests which is basically the same as the as the one above with the only difference being in that the total for each subscriber will be specified in the subscription record.

2. Fixed Borrowing Limit

Specifies the universal limit for the 'fixed limit' or 'fixed less requested' option.

3. Requisition Limit

The requisition limit can either be fixed or dependent on the number of books you will have borrowed. Use the second option if you have specified Fixed less requested in 2 above.

4. Fixed requisition limit

Specifies the universal limit for the 'fixed limit' or 'fixed less borrowed' option.

5. Loan duration as to

Specifies how the loan duration is going to be determined. The loan duration can be

- Fixed
- Vary from book to book
- Vary from subscriber to subscriber

6. Fixed Loan duration

Used to specify a loan duration between 0 days and 12 months 31 days. The loan duration must be specified as follows

- Two digits representing the number of months between 00 and 12
- An 'M'
- Two digits representing the number of days between 00 and 31
- A 'D'

For example 01M07D for 1 month 7 days.

It must be stressed that the number of days and months must be specified as **two** digits. Where the number is between 1 and 9 inclusive, you must prefix it with a 0. No other format is acceptable.

7. Request valid for

This specifies the period over which the request will be considered valid. For example, if a book is due on 02/08/2000 and if the period of request validity is 00m05D then if the book is requested, the request will expire on 07/08/2000 and after the 7th it will be flagged as expired although it may still be processed until it is explicitly cancelled.

The Users Category

Librarius allows you to have up to 3 librarians at any one time. Of these, one will be the high priority user described in the section Database Initialisation earlier in this chapter. Each user must be allocated a unique name and password. The system identifies users by their passwords and these should be allocated to the other two users by User1. To enter or change the user's name, simply tab to the text box and enter the name.

To enter or change the password,

- Click the key button alongside the particular user's details. You will be presented with the following window.

Figure 7: Specify or change password window

- Enter the password and press enter
- Enter the password again and press enter.

If the two entries match, the password for that user will be set to the new password. If they do not, you will be asked to repeat steps 2 & 3. At any point during the entry, you can press Escape to cancel the operation.

- For a user to be treated as Existing by the system, you must specify both the user's name and password.
- Although you can have a User 2 without a User 3, you cannot have a User 3 without a User 2.

Once you have specified the above, you should then proceed to use the Access Privileges utility to specify the user's access privileges. A user will not be able to use the system until these have been set. For more information, see Chapter 6.

The Start up Category

The start up category allows you to specify the actions that should be undertaken when the system starts up.

1. Confirm Date

If you enable this property by marking it, then the system will always prompt you to confirm the date and time whenever you start Librarius 2000 Plus. Since a library system is very time sensitive, you are advised to enable this option to ensure that Windows date and time errors do not jeopardise your data.

2. Summary Statistics

Enabling this option will result in Librarius 2000 giving you a summary of your database statistics as shows below when you start up.

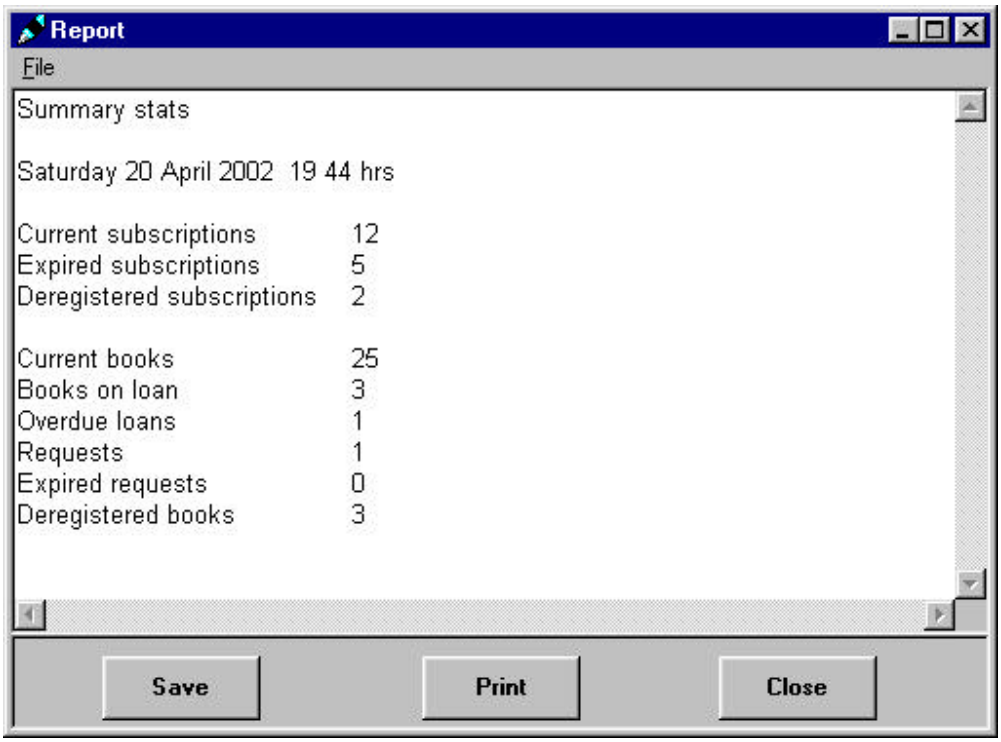


Figure 8 : Summary Statistics Window

If your system is taking too long to start up Librarius 2000 then turn this option off. You can always obtain the summary when you want it by choosing 'Quick Statistics' from the Librarius 'Tools Menu'

Librarius 2000 Plus Components

Librarius 2000 Plus is made up of is made up of the main system called Librarius 2000 Plus and 9 utility. The main program does the following

- Facilitates the loaning and returning of books
- Facilitates requisitions making and processing
- Allows the user to specify the main system settings
- Allows the user to create and maintain book and subscription records

The functions of the 9 utility programs are as follows

Utility	**Function**
Backup	Create compact Librarius 2000 plus backup files
Calendar	Allows you to browse through the Librarius 2000 Plus calendar that is from January 1800 to December 2100.
Database Initialisation	Allows you to set up the Librarius 2000 Plus databases.
Query	Allows you to write and execute SQL statements on the Librarius databases.
Repair and Optimise	Repair and/or optimise the Librarius 2000 Plus databases.
Report	Provides you with text editing, report writing and mail merge facilities.
Restore	Restores Librarius 2000 Plus databases from Librarius 2000 Plus backup files.
Security	Provides the high priority user with facilities for creating and maintaining the access privileges for Users 2 & 3.
Transactions	Provides you with a facility for viewing and analysing the Librarius 2000 Plus transaction logs. These logs are a record of all the data processing activities, carried out on the system.

Chapter 2:

Managing Subscription And Book Records

Current Subscriptions

Librarius provides you with an easy to use environment that allows you to enter and maintain subscription records for Current subscribers. This facility is provided through the subscription window and to access it simply choose Subscriptions from the Librarius 2000 Plus 's *Database* menu.

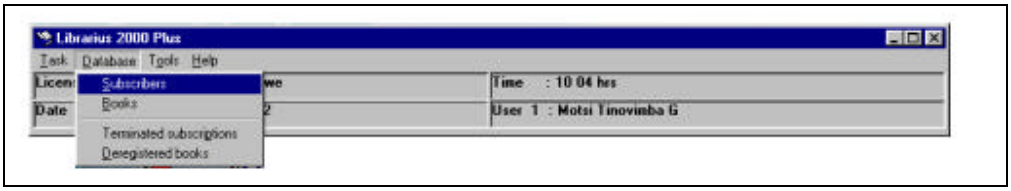


Figure 9: The Librarius Database Menu

Entering a new subscription

To enter a new subscription

1. Choose new from the Subscription window's Task menu. You will be presented with a blank form and the Previous, Next & Close buttons will be replaced by the Save, Help & Cancel buttons.
2. Fill the form observing the requirements given in the table below. Items that you may omit are prefixed by the word **Optional**.
3. Choose **Save**. You will be prompted to confirm some details. If you discover that you have entered an item incorrectly then choose No, correct the entry and repeat this step.
4. If the subscription is saved correctly, your display will be returned to the one before you started entering the data with the new subscription displayed otherwise you will be returned to the record you were viewing before the failed attempt to add a new subscription record.
5. At any one time during the editing process, you may choose the Help button if you require assistance or you may choose Cancel to cancel the 'New entry' operation.

Figure 10: Subscriptions Window

Item	Valid entry
Subscriber ID	A unique subscription identification code that must obey the subscriber ID pattern declared during database initialisation. It must be 8 characters long.
National ID	Any alternative ID number you may wish to keep. Maybe a national ID, passport number or even a receipt number. Should not exceed 20 characters.
Name	Made up of 3 items. ➢ In the first box, enter the subscriber title that maybe up to 4 characters long. ➢ In the second box, enter the initials that may be up to 4 characters long. ➢ In the third box, enter the surname that maybe up to 15 characters long.

Registered on	Enter the official date of registration in the following format Date/Month/Year where the date and month are 2 digit numbers prefixed by a 0 where necessary and the year is a 4-digit number. Alternatively, you can enter today's date by simply clicking the button alongside the Registered on date.
Expires On	Enter the last date on which the subscription will still be valid using the Date/Month/Year format described above.
Remark	**Optional**. Any additional notes you may wish to make.
Borrowing fee	The borrowing fee in cents ranging from 0 to 32767.
Borrowing limit	The borrowing limit that should range between 0 and 20 inclusive.
Loan duration	The loan duration ranging from 00M00D to 12M31D. See the section 'The limits category' under 'Customising your system' in Chapter 1 for more details on the format.
Home Address	May include more than one line and maybe be up to 60 characters long.
Home phone number	**Optional**. May include letters & Spaces and may be up to 12 characters long.
Contact address	**Optional.** May include more than one line and maybe be up to 60 characters long.
Contact phone number	**Optional**. May include letters & Spaces and may be up to 12 characters long.

Browsing through the subscription records

You may move from one subscription record to the one after it by choosing 'Next'. If this button is dimmed then the record you will be viewing will be the last one in the list. To view the previous record, click the 'Previous' button. If the button is dimmed then the record you will be viewing will be the first one in the list.

Determining the viewing order

You may view subscriptions in the order of the

- Subscriber ID's
- Names
- Expiry dates
- Registration dates.

For example, if you want the subscriptions too appear in alphabetical order of the surname then you all you have to do is to choose the Name sorting order. To do this

1. Choose sort from the subscription window's Task menu. The 'Sort Window' should then appear.
2. Click the downward facing arrow on the sort button and choose the sorting order you want.
3. Click the OK button or press the Enter key

Figure 11: Sort Window

Locating a particular record

During you normal browsing you may jump to any particular subscription by doing the following

1. Choose Locate from the subscriptions window's Task menu. The following dialogue box will appear with the sorting order in use in the Sort as to box.

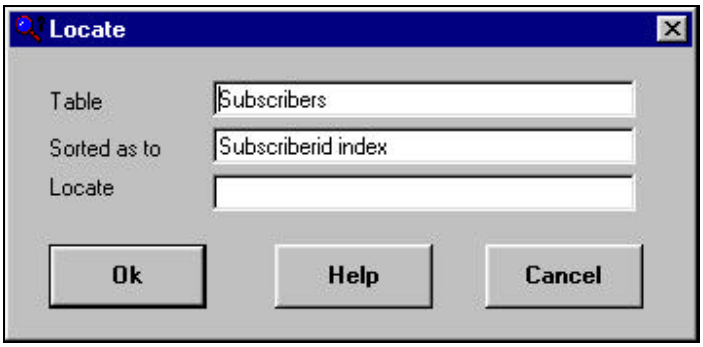


Figure 12: Locate Window

2. Enter the item you wish to find which should be in line with the sorting order. For example, if the sorting order is the 'Name Index' then enter a surname or if it an expiry date then enter a date. All dates must be in the Date/Month/Year format explained earlier.
3. The system will then try to locate the subscription item. If it is unable to do so then it will look for the best alternative match that is defined as the item that would appear immediately after the search item if it was there. If this also fails then a Subscriber not found dialogue box would be displayed.

Editing subscription details

To change any of the details in a subscriber record

1. Browse to the desired subscription record
2. Choose 'Edit' from the subscription windows task menu.
3. Change the details you want changed. The valid entry formats specified under 'Entering a new subscription' also apply here. You may change all the details save for the subscription ID code.
4. Choose Save

5. Confirm the details you are prompted to confirm.
6. If the editing is successful, you will be returned to the record you were viewing with all the changes made having been effected.

Terminating a subscription

To terminate any given subscription

1. Browse to the desired record
2. Choose 'Deregister' from the subscription window's Task menu. If the concerned subscriber does not have any books on loan or request, you will be presented with the window shown below. If not, you will be told why the system will not be in a position to terminate the subscription.

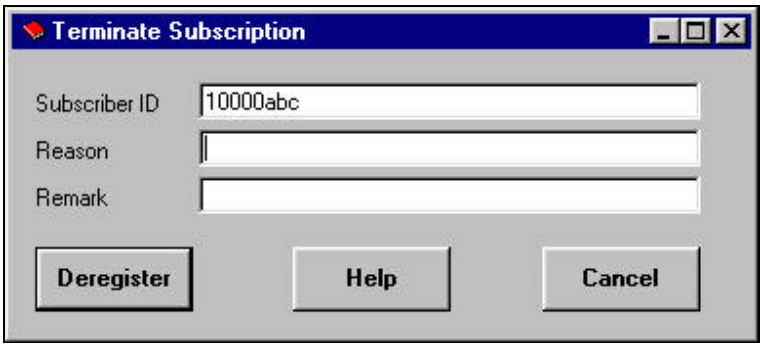


Figure 13: Deregistration Window

3. Enter the reason and if you want to, you may also enter a cancellation remark. Each maybe up to 30 characters long.
4. Choose deregister.
5. If the subscription is terminated successfully, you will be given a confirmation message and returned to your Browsing.

You should consider having a set of standard reasons that you enter as the reason and to include any other information as a remark. This will allow you to later select similar deregistrations when preparing reports.

Saving to Text or Printing the displayed subscription record

You can print the displayed subscription record or save it to a text file of your choice for opening letter in a text editor like Notepad or even a Word processor like Word. To do this,

1. Choose Report from the subscription window's Task menu.
2. To print the report,
   - Click the print button or choose print from the report window's File menu.
   - A 'Print' window will then appear (See Chapter 5 for details on printing)
   - Choose Print

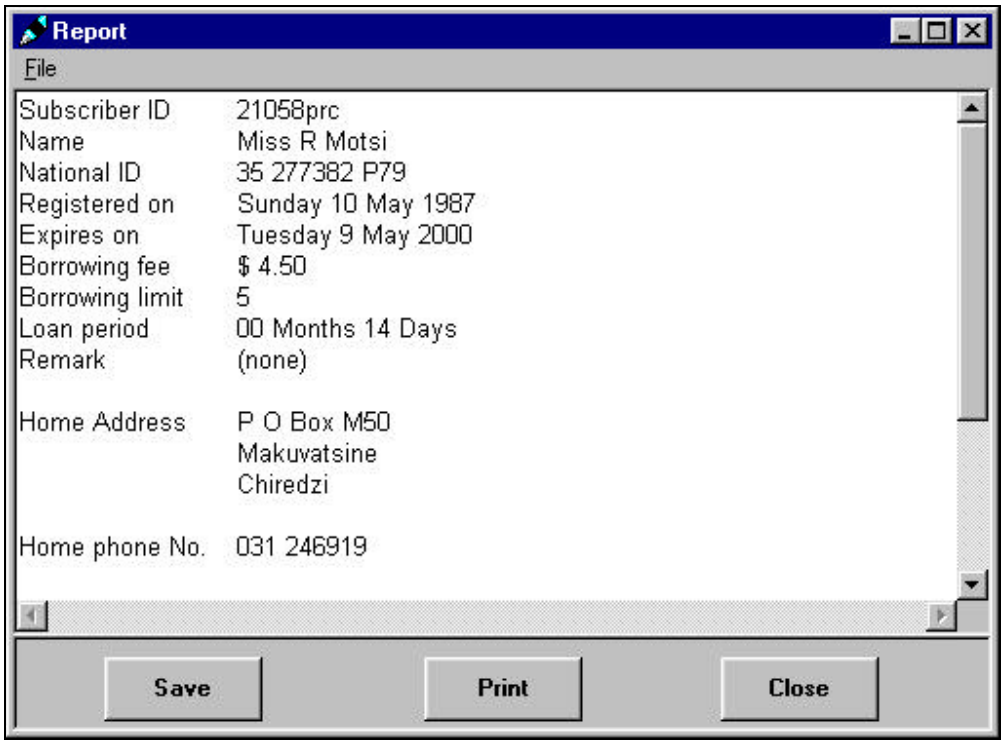


Figure 14 : Report Window

3. To save the report,
   - Click the Save button
   - Choose Save from the report window's File menu.
   - Enter the file name and choose ‘Save’ or press enter.
4. To close the report window, choose the Close button.

Terminated subscriptions

Librarius 2000 Plus allows you to browse through the records of terminated subscriptions. This facility is provided through the Terminated Subscriptions window shown below that is available from the 'Database' menu of Librarius 2000.

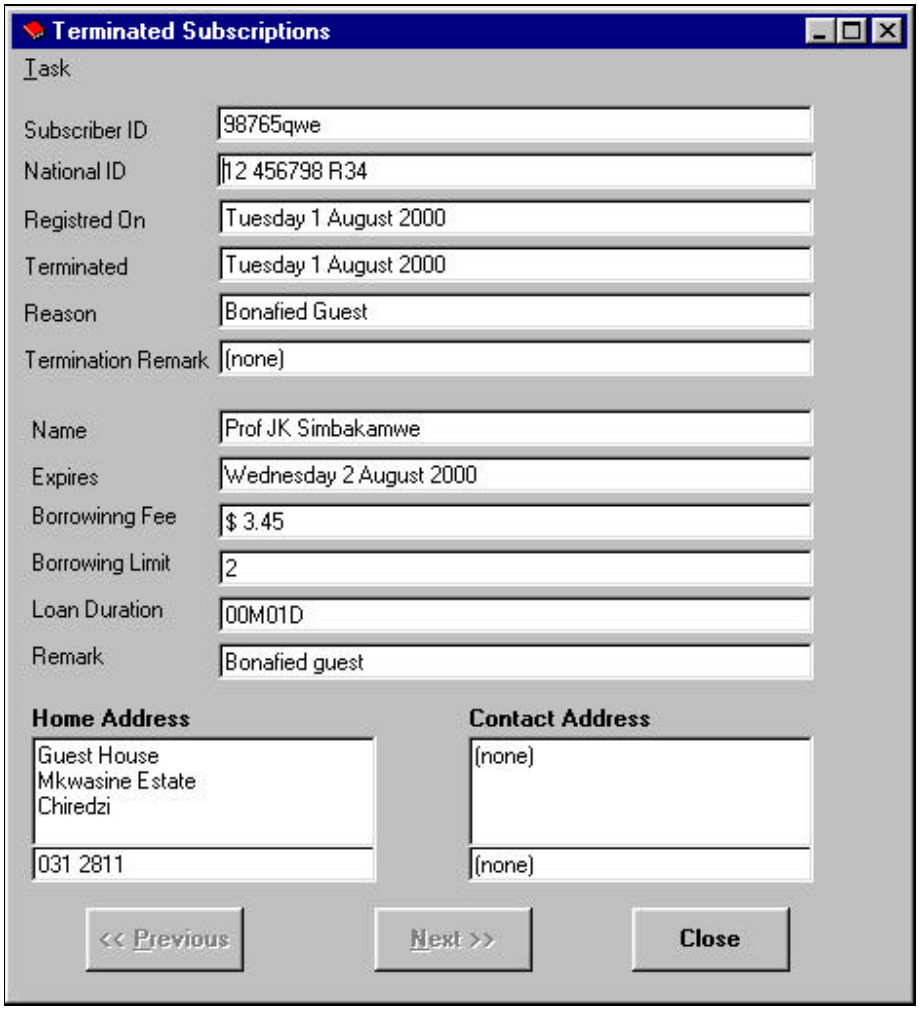


Figure 15: Terminated Subscriptions Window

It must be stressed that you can only browse through these records that is to say that you cannot alter them in any way. The browsing techniques outline under Current Subscription also apply here with the only change being that the Terminated Subscription window provides you with 2 more sorting indexes which are

- The deregistered on index (Date)
- The reason index

Managing Book Records: Books in the library and in circulation

Facilities for managing books in the library and in circulation are provided by the Books window that is accessed in Librarius by choosing Books from the 'Database' menu. This window provides the same facilities to Book records management that the Subscriptions window provides to Subscription records management.

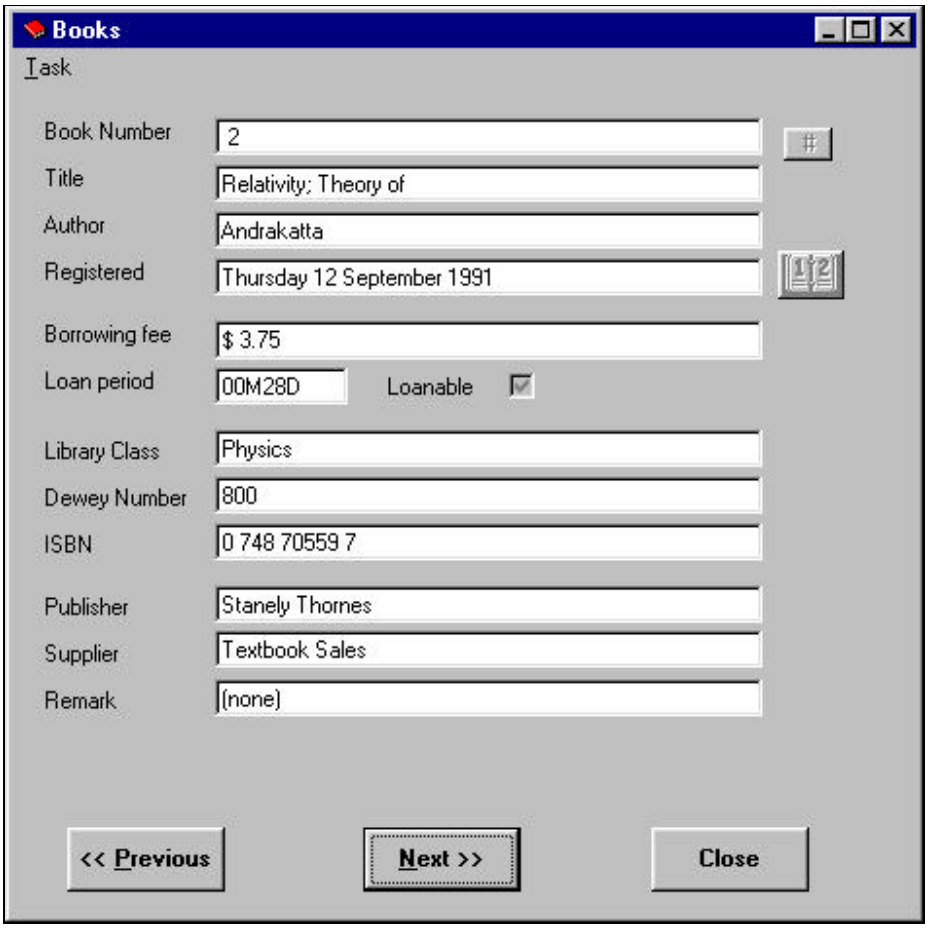


Figure 16: Books Window

Registering a new Book

1. To register a new book, choose New from the Books window's Task menu. You will be presented with a blank Books Window Screen.
2. Enter the details ensuring that they are in line with the data entry specifications listed below. The items that you may leave out are prefixed by the word Optional.

Item	Valid entry
Book number	Must be between 1 and 2'147'483'647 inclusive. Alternatively you can click the # button and the system will automatically fine a free number for you.
Title	May be as long as 25 characters.
Author	Maybe as long as 20 characters
Registered	Enter the official date of registration in the following format Date/Month/Year where ➢ The date and month are 2 digit numbers prefixed by a 0 where necessary and ➢ The year is a 4-digit number. Alternatively, you can enter today's date by simply clicking the button alongside the Registered on date.
Borrowing fee	An amount in cents between 1 and 32767 inclusive.
Loan period	The loan duration ranging from 00M00D to 12M31D. See the section The limits category under customising your system for more details on the format.
Loanable	If this box is not marked then all attempts to loan it out will be blocked. To mark or unmark this box, click it or tab to it and press the space bar.
Library Class	The library class to which the book belongs e.g. Fiction. Maybe as long as 10 characters.
Dewey number	The Dewey decimal classification system number for the book. Maybe up to 15 characters.
ISBN	The International Standard Book Number for the book. Maybe up to 20 characters.
Publisher	Up to 25 characters.
Supplier	**Optional**. Any notes you may wish to make.
Remark	**Optional**. Any notes you may wish to make.

3. Choose Save
4. Confirm the details
5. If the record is saved successfully, it will be displayed in the browsing window.

Browsing through the book records

The browsing techniques outlined under Current Subscriptions also apply to this section with the only difference being in the sorting indexes available. The sorting indexes for the Books window are as follows.

1. Title index
2. Book number index
3. Author index
4. Registered on index

5. Dewey index
6. Class index

Editing a given book record

To change any of the details in a book's record

1. Browse to the desired book's record
2. Choose edit from the Books windows Task menu.
3. Change the details you want changed. The valid entry formats specified under ‘Registering a new book’ also apply here. You may change all the details save for the Book number.
4. Choose Save
5. Confirm the details you are prompted to confirm.
6. If the editing is successful, you will be returned to the record you were viewing with all the changes made having been effected.

Deregistering a Book

To deregister a book

1. Browse to the desired record
2. Choose ‘Deregister’ from the Books window's Task menu. If the concerned book is not on loan or request, you will be presented with the deregistration window. If not, you will be told why the system will not be in a position to deregister the book.
3. Enter the reason and if you want to, you may also enter a cancellation remark. Each maybe up to 30 characters long.
4. Choose deregister. If the book is deregistered successfully, you will be given a confirmation message.

Saving to a text file or Printing out the displayed record

To print out the displayed book record or to save it to a text file, choose Report from the Books window's Task menu and then follow the instructions outline under the section ‘Saving to a text file or Printing the displayed record’ in the Subscription sections.

Deregistered Books

Librarius 2000 Plus allows you to browse through the records of Deregistered Books. This facility is provided through the 'Deregistered Books window' available from Librarius' 'Database' menu.

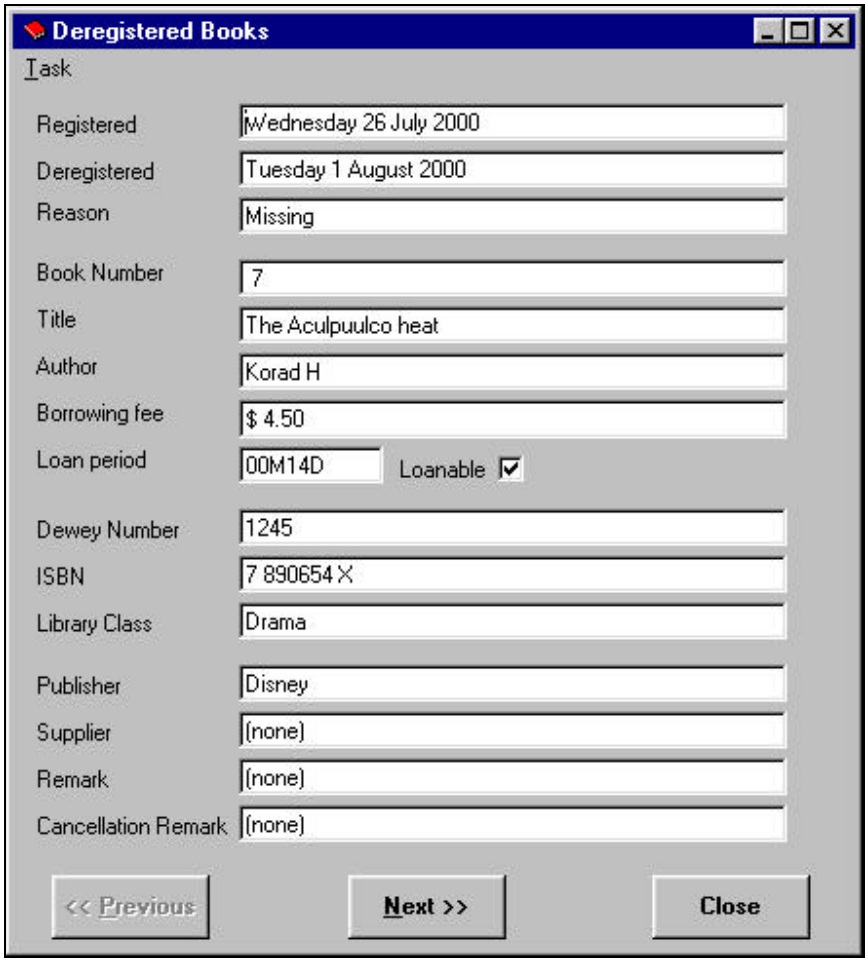


Figure 17: Deregistered Books Window

It must be stressed that you can only browse through these records; you cannot alter them in any way. The browsing techniques outline under 'Books in Loan and Circulation' also apply here with the only change being that the Deregistered Books window provides you with 2 more sorting indexes which are

- The deregistered on index (Date)
- The reason index

Chapter 3: Loans And Requisitions

Making loans

In Librarius 2000 Plus, loan making facilities are provided throughout the Borrow windows shown below. To access it, choose Borrow from the Librarius 2000 Plus Task menu.

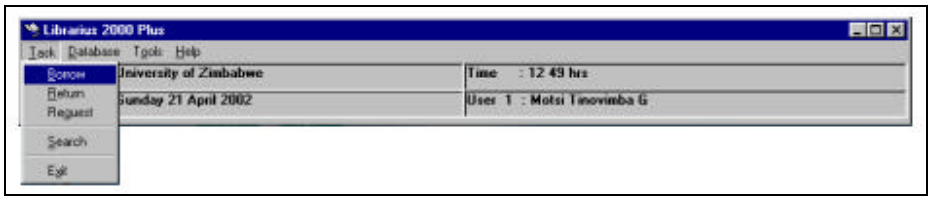


Figure 18: Librarius Task Menu

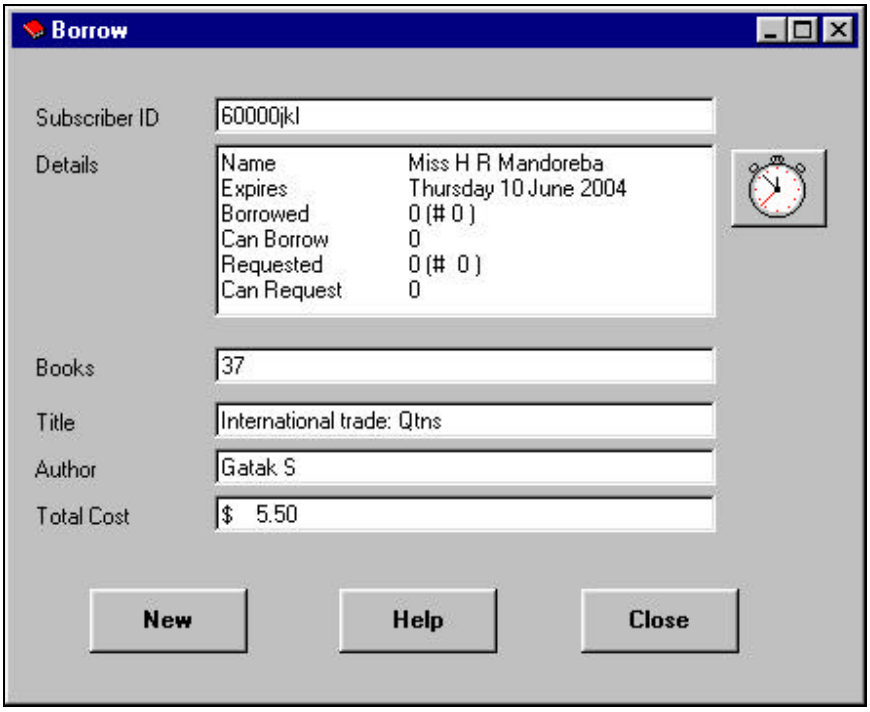


Figure 19: Borrow Window

To make a loan

1. Enter the subscriber ID code of the borrower in the subscriber ID box and press Enter. Some useful subscription information including the full name of the subscriber will be displayed in the Details text box if the entered subscription code is valid. The 2 numbers prefixed by a '#' represent overdue books and expired requisitions respectively
2. Enter the book number and press Enter. If the book number is valid, its Title and Author will be displayed in the respective text boxes and the borrowing fee will be added to the amount the Total Cost text box.

3. If the displayed details are correct then press enter to confirm the loan otherwise press any other key and repeat the second step along with this one.
4. Repeat the second and third steps to loan out any more books to the same subscriber.
5. To make a loan to a different subscriber, Click the New button or press F2 and choose New from the pop up menu shown below. This menu is available in all the listed facilities and you can also use it to quickly switch between the listed facilities.

Figure 20: F2 Pop up menu

Returns

This facility allows you to process returns and it is provide through the returns window shown below. To access it, choose Return from Librarius 2000 Plus's Task menu.

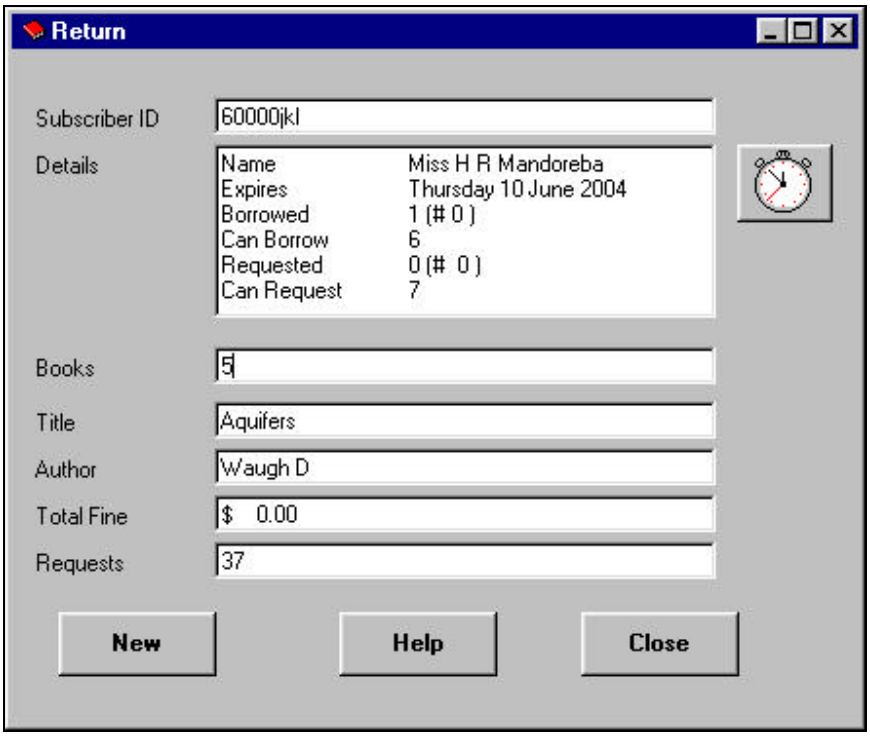


Figure 21: Returns Window

To process a return

1. Enter the subscriber ID code of the subscriber in the subscriber ID box and press Enter. Some useful subscription information including the full name of the subscriber will be displayed in the Details text box if the entered subscription code is valid. The two numbers prefixed by a '#' represent overdue books and expired requisitions respectively.
2. Enter the book number and press Enter. If the book number is valid, its Title and Author will be displayed in the respective text boxes and if it is overdue, the fine levied on it will be added to the amount the Total Fine text box
3. If the displayed details are correct then press enter to confirm the return otherwise press any other key and repeat the second step along with this one. If the book has been requested by another subscriber, its book number will be added to the Requested text box.
4. Repeat the second and third steps to process any more returns by the same subscriber.
5. To process returns from a different subscriber, Click the New button or press F2 and choose New from the pop up menu.

Making Requisitions

This facility is provided through the Requests window shown below. To access it, choose requests from the Librarius 2000 Plus Task menu.

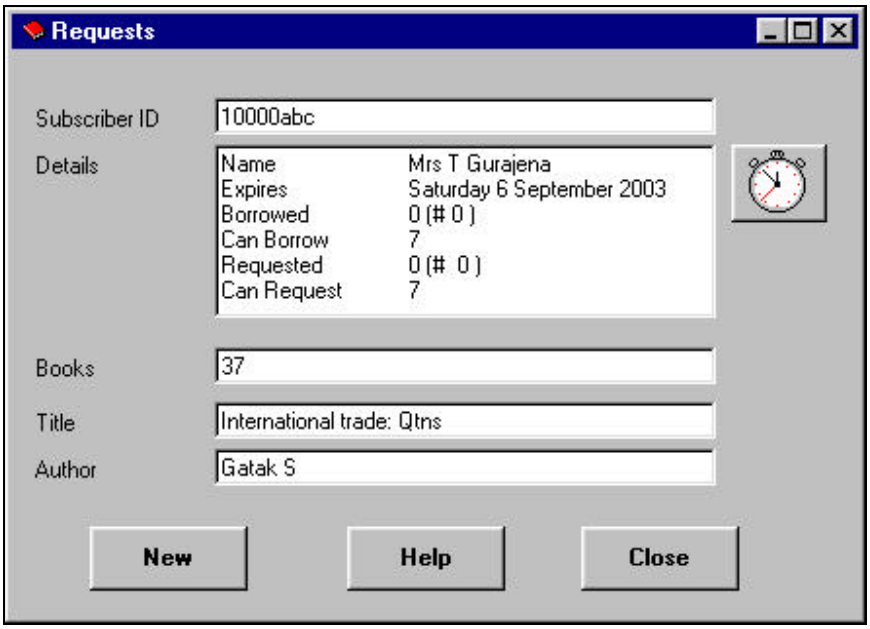


Figure 22: Requests Window

Making a requisition

1. Enter the subscriber ID code of the subscriber in the subscriber ID box and press Enter. Some useful subscription information including the full name of the subscriber will be displayed in the Details text box if the entered subscription code is valid. The two numbers prefixed by a '#' represent overdue books and expired requisitions respectively
2. Enter the book number and press Enter. If the book number is valid, its Title and Author will be displayed in the respective text boxes.
3. If the displayed details are correct then press enter to confirm the requisition otherwise press any other key and repeat the second step along with this one.
4. Repeat the second and third steps to process any more requests concerning the same subscriber.
5. To process requisitions made by a different subscriber, Click the New button or press F2 and choose New from the pop up menu.

Requests are automatically deleted when the subscriber borrows the book.

Managing loans and requisitions

Once a book has been requested or borrowed, a link will appear on its record in the Books window to details of this loan and/or request. If the book has only been borrowed or requested then only the respective link will be shown. To gain access the loan or requisition data, click the corresponding link and a dialogue box like the one shown below will appear. The one for requisitions is similar to the one for loans.

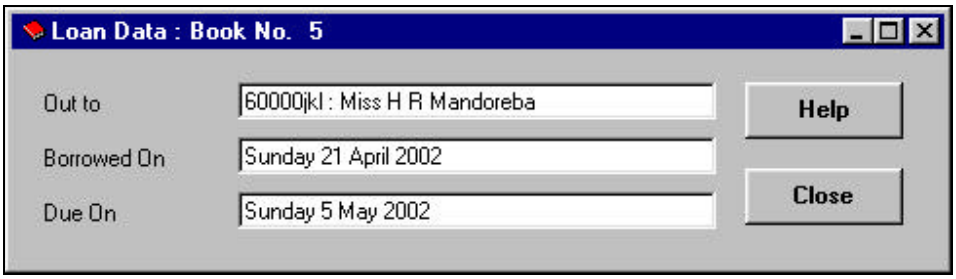


Figure 23: Loan Data Window

The above mentioned dialogue boxes will only allow you to look at the data i.e. you will not be allowed to change it in any way. To change the loan or requisition data, you must use the dialogue boxes provided by the *Subscriptions* window.

The Subscriptions' loan and requisition management window allows you to change the due/expiry dates and to delete loans and requisitions. The one for the loans is shown below.

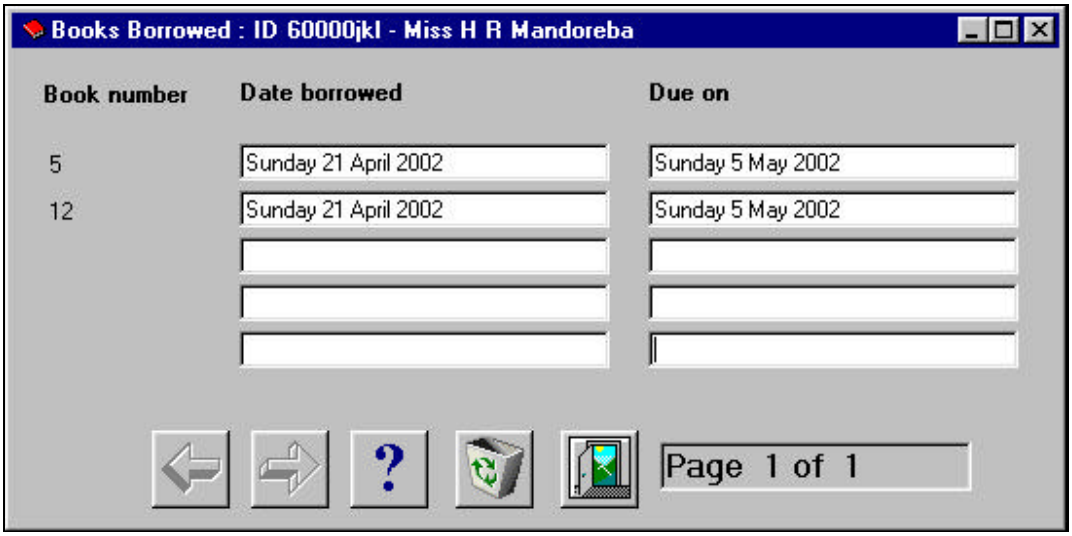


Figure 24: Loan Management

To access either of the two subscription dialog boxes mentioned above,

1. Open the Subscriptions window by choosing Subscriptions from the Database menu in Librarius 2000 Plus.
2. Browse to the record of the concerned subscriber.
3. Click the respective link to gain access to the dialog box you want.

Once you have the dialog box on the screen, you can use it to change the due/expiry dates and to cancel loans/requisitions depending on the dialog box you will be in. It should however be noted that you cannot change the dates on which the loan/requisition was made and you cannot set the due/expiry date to a date before this date. If the window indicates that it has more than one page then you can move to the previous or next page by clicking the ← or → buttons respectively.

Changing the due date

1. Click the due date you wish to change. The following dialog box will be displayed

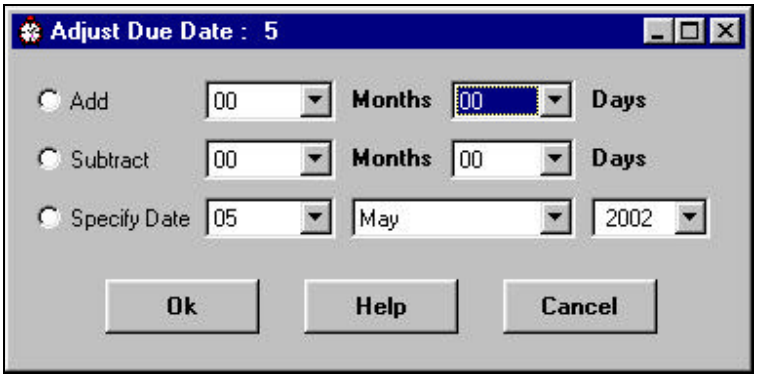


Figure 25: Adjust Due Date

2. To subtract a given number of days or months,
   - Choose Subtract by clicking it
   - Choose the number of days from the list by clicking the downward facing arrow and then clicking the number of days you wish to subtract. Do the same for the months.
   - Choose OK
3. To add a given number of days or months,
   - Choose Add by clicking it
   - Choose the number of days from the list by clicking the downward facing arrow and then clicking the number of days you wish to add. Do the same for the months.
   - Choose OK
4. To change the due date to a specific date
   - Choose Specify Date
   - Select the day, month and year from the list given.
   - Choose OK
5. The due date will be update along with the display

To cancel a loan

1. Place the mouse pointer over the book number of the book whose loan you wish to cancel and hold down the left mouse button.
2. Holding the left mouse button down, move the mouse pointer towards the bin button. The mouse pointer will change to a book.
3. When the mouse pointer is directly above the bin, release the mouse left button.

4. When you are prompted to confirm the cancelling of the loan, choose 'Yes' if you wish to cancel the loan. The loan will be cancelled, a confirmation message given and the display updated.

All the above procedures also apply to Requisitions

Chapter 4: Finding Information

Librarius 2000 Plus provides you with two methods for quickly finding information. These are the Search facility and the SQL utility.

The Search Facility

To gain access to the search facility, choose search from the Librarius 2000 Plus Task menu. This facility allows you to quickly obtain access to records that match a certain criteria.

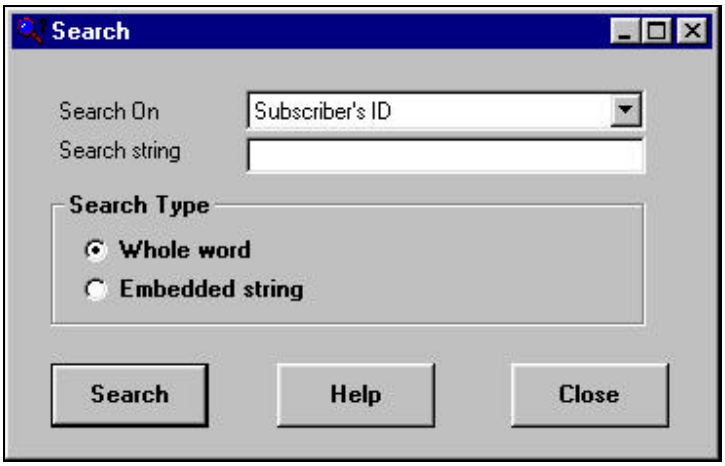


Figure 26: Search Facility Window

To find all the book or subscription records that match a certain criteria,

1. From the 'Search On' drop down list, choose the item on which the search will be based. It must be one of the following
   - Subscriber ID
   - Subscriber surname
   - Subscriber Initials
   - Subscriber title
   - Book number
   - Book title
   - Book author
2. Specify the search string that all the returned records must match e.g. 12345xyz for a Subscriber ID based search
3. Specify the search type.
   - If you choose the *Whole word* option then only those records which contain the search item specified above that will be identical to the search string also specified above will be presented as matches.
   - If you choose an the Embedded option then all records which contain the search string anywhere in the search item will be presented as matches. For example, if the search string is Jumo then matches will include surnames like Jumo, Rajumo, Jumoka and Makajumoka.

4. Choose the Search button.
5. If any matches are found, you will be presented with the following Results window

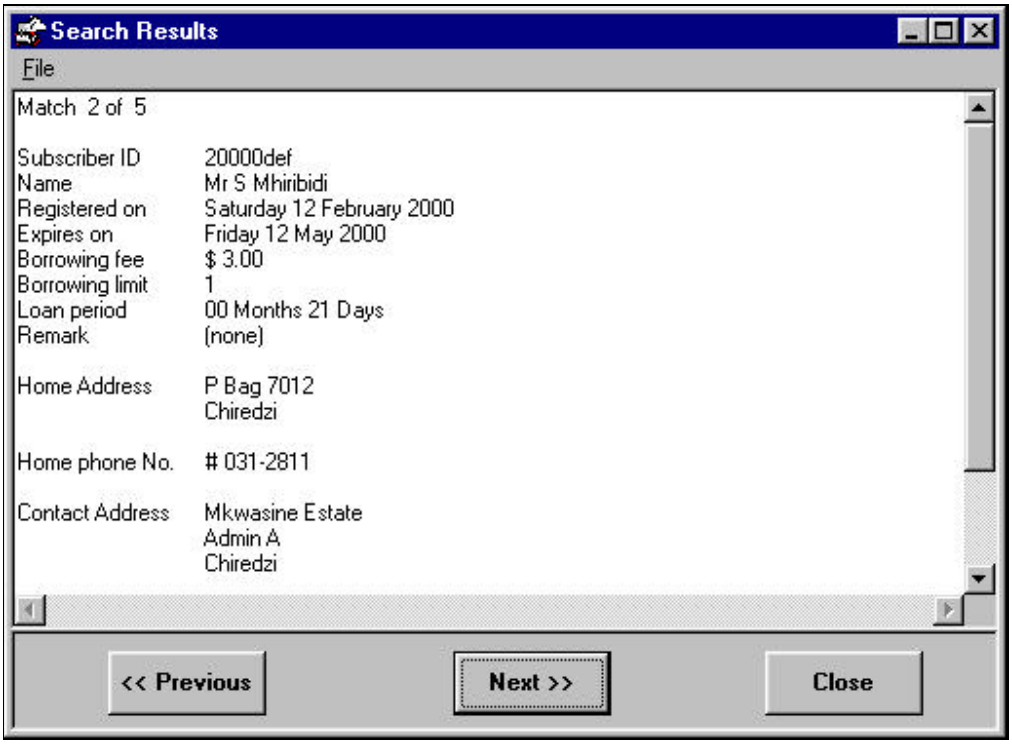


Figure 27: Search facility Results Window

6. If more than one match is found, indicated on the first line of the results, then you may use the Next and Previous buttons to view the other matches. You may print the search results or save them to a text file by following the procedures outlined in Chapter 2 under Printing the displayed subscription record.

The search utility is case insensitive i.e. it interprets JUMO, Jumo, jumo and juMo as identical.

The Query Utility

The Query utility enhances your ability to quickly locate information through the use of SQL (Standard Query Language). It should however be noted that you are only allowed to execute queries which only look up data. The queries you enter must therefore start with Select and should not be Make table queries. For more information on SQL, please consult a Microsoft Access SQL Guide.

Opening your databases in Microsoft Access may lead to Permanent Damage and huge losses of data.

For the purpose of SQL, the following is the structure of the two Librarius 2000 Plus databases and points worth noting in your construction of SQL statements.

Main Database Table Structure

Table Name	Field Name	Remarks
Subscriber Table	Subscriber ID	Text
	National ID	Text
	Registered on	Date
	Surname	Text
	Initials	Text
	Subscriber title	Text
	Home Address	Text
	Home phone number	Text
	Contact Address	Text
	Contact phone number	Text
	Expiry Date	Date
	Borrowing fee	Integer
	Borrowing limit	Integer
	Loan Period	Text 4 characters. ➢ First 2 represent the number of month ➢ Other two represent the number of days.
	Remark	Text
Terminated Subscriptions Table	All the fields in the Subscriber Table as they are.	
	Deregistered	Date deregistered
	Cancellation remark	Text. Remark entered during deregistration.
	Reason	Text. Reason entered during deregistration.

Books Table	Book number	Long integer
	Date registered	Date
	Book title	Text
	Book author	Text
	Borrowing fee	Integer
	Loan period	Text: See Subscribers Table
	Loanable	Boolean.
	Publisher	Text
	Supplier	Text
	Dewey	Text
	Class	Text
	ISBN	Text
	Remark	Text
Deregistered Books	All the fields in the Books Table as they are.	
	Deregistered	Date Deregistered
	Cancellation Remark	Text
	Reason	Text
Books borrowed table	Subscriber ID	Text
	Book number	Long integer
	Date borrowed	Date
	Date due	Date
Books requested table	Subscriber ID	Text
	Book number	Long integer
	Date requested	Date
	Expiry date	Date

Transaction Database Structure

Table Name	Field Name	Remarks
Main log	Date	Date on which transaction occurred. Includes time information so work with ranges and not exact values.
	Subscriber ID	Text
	Type	An integer. 10 – Borrow 11 – Extend loan 20 – Return 21 – Delete Loan 30 – Request 31 – Request process 32 – Extend Request 33 – Delete Request
	Book number	Long integer
	Amount	Currency. Refer to the table on the use of the Amount and Extra Date columns later on.
	Extra date	Date
Books log	Date	See the main log Date field description.
	Type	An integer. 50 – New 51 – Edit 52 – Deregister
	All the fields in the Books Table.	➢ The loan period in the Books log has 6 characters and appears as it does when entered with the M and D. ➢ For Deregistration transactions, only the Remark column is used and it is used to store the Cancellation remark. All the other columns are padded with Nulls during deregistration.
	Reason	Text

Subscriber Log	Date	See the main log Date field description.
	Type	An integer. 60 – New 61 – Edit 62 – Deregister
	All the fields in the Subscriber Table.	For Deregistration transactions, only the Remark column is used and it is used to store the Cancellation remark. All the other columns are padded with Nulls during deregistration.
	Reason	Text
User's Log	Time in	See the main log Date field description.
	User name	Text
	Session	Long Integer A unique number that determines a session.
	Area	Integer 1 – Main 2 – Security 3 - Backup 4 – Optimise 5 – Restore 6 - Transactions 7 - Report 8 - Query
	Time out	See the main log Date field description.

Use of columns in the Main Log

Date	Type	Subscriber ID	Book number	Extra date	Amount
	10	ID	ID	Due date	Borrowing fee
	11	ID	ID	New due date	Days extended by
	20	ID	ID	Date due	Fine if any
	21	ID	ID	Date due	
	30	ID	ID	Expiry date	
	31	ID	ID	Expiry date	
	32	ID	ID	New expiry date	Days extended by
	33	ID	ID	Expiry date	

Executing a query

1. Start 'Direct SQL' by choosing it from the Librarius program group.
2. Type in the SQL. It must start with Select and must not be a make table query.

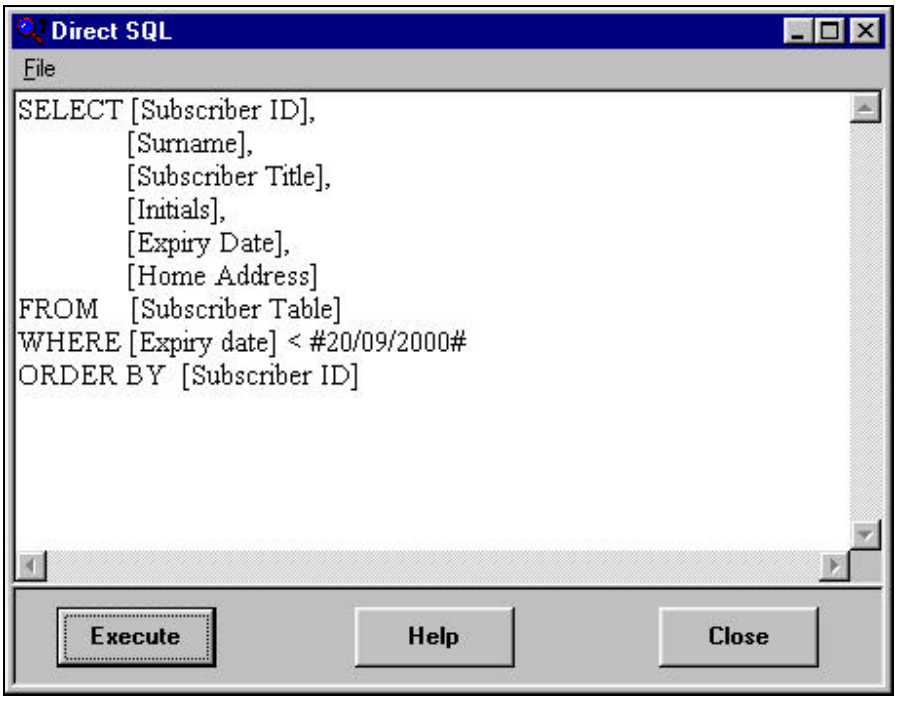


Figure 28: Direct SQL

3. Choose Execute. If the SQL is executed successfully, you will be presented with the SQL results window.
4. In most cases, the columns will not be the right width and some of the information will not be visible. To adjust the column widths so as to display the column's information fully, follow the following steps which resize the Surname column in the SQL results given on the next page
   - Place the mouse pointer on the line on the Title bar between the Surname and Title fields and hold down the left mouse button. The mouse pointer should change to a sideways facing arrow when you do this.
   - Without releasing the left mouse button, move the pointer to the right to increase the width and to the left to reduce it.
   - Release the mouse button when the column has been adjusted to the width you desire.
5. In the case of subscriber addresses, when the results are presented, only the first line of the address will be shown. To display more lines for the record number 2
   - Place the mouse pointer on the line on the Row Number bar between the rows number 2 and 3 and hold down the left mouse button. The mouse pointer should change to an arrow pointing to the top and bottom when you do this.

- Without releasing the left mouse button, move the pointer down to increase the number of displayed lines and up to reduce the number of lines displayed.
- Release the mouse button when the row has been adjusted to the height you desire.

6. If the query returns more than 100 records then they will be displayed on the screen in pages of 100 records each. To view other pages, Use the Next (➔) and Previous (🡐) buttons at the bottom of the Results window.
7. You may save the displayed SQL text or print it out to by following the procedures out lined in Chapter 2 under Printing the displayed subscription record.

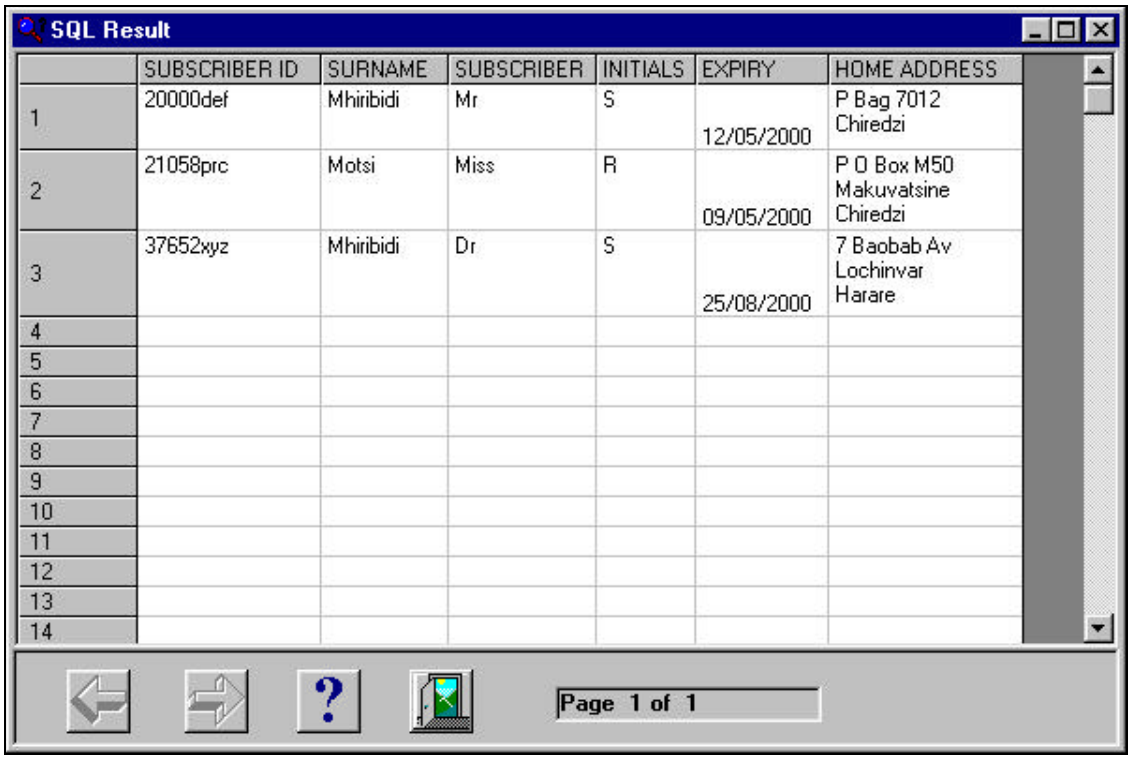


Figure 29: SQL Results

Chapter 5: Reports & Mail Merge

Librarius' Report Maker allows you to carry out Text Editing, Mail merge and Report Writing operations. The Report Maker is accessible from the Librarius Program manager group

Text Editing

To begin a text editing session,

1. Start the Report maker or if you are already in the Report Maker, choose New Session from the File menu.
2. You will be presented with the following screen.

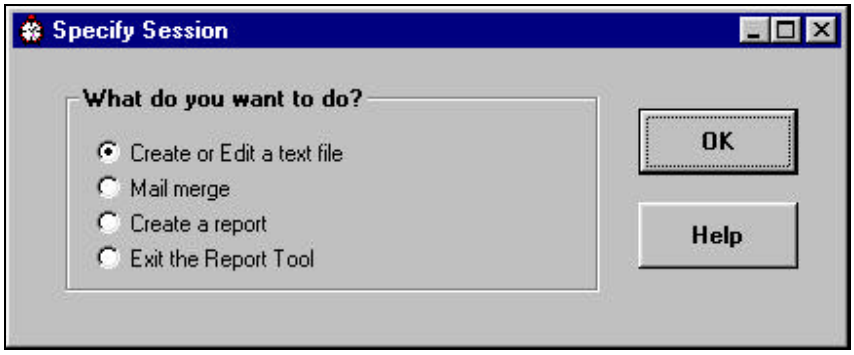


Figure 30: Specifying a Report Session

3. Click the text editing option and choose OK.

During the text editing session, you will be able to carry out the following tasks

- Opening an Existing file
- Saving the displayed text
- Beginning work on a new document
- Printing the displayed text
- Changing the font
- Finding or replacing every occurrence of a given word or phrase
- Inserting dates or text files

All of the above will also be available when you do you reports and mail merge.

Opening an existing file

To open an existing file

1. Choose Open from the File menu. You will be presented with a standard Open Dialogue box.

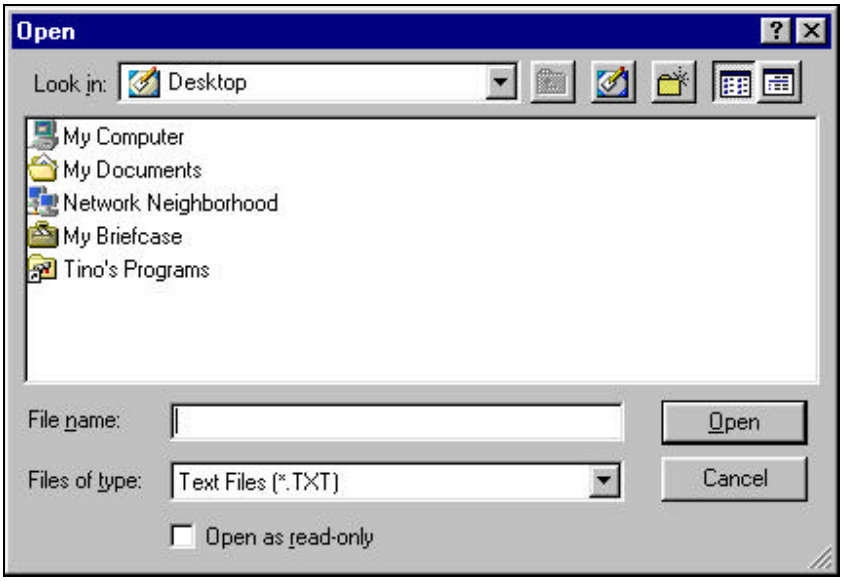


Figure 31: Standard Open Box

2. Enter the filename in the space provided
3. Choose Open or simply press Enter. To abort the open operation simply press the Escape key or choose Cancel.

Saving a file

To save the displayed text in a text file which you may open later in the report maker or a Word Processor

1. Choose Save from the File menu. You will be presented with a standard Save Dialog Box.
2. Enter the file name.
3. Choose Save or simply press Enter.

If you already have a file name appearing on the title bar of the report maker utility, choosing Save from the File menu will lead to the system performing the second and third steps automatically. If you wish to save the file under a file name other than the one on the title bar then choose **Save As**.

Beginning work on a new document

If you have been working on a document and you wish to begin work on a new document then

1. Choose Close from the File menu
2. You will be prompted to save the displayed text. If you wish to do so, choose 'Yes'.

Printing the displayed Text

You may wish to print the whole text or just a portion of it. To do so

1. If you wish to print just a portion of the text then select the text you wish to print by holding the shift key whilst specifying the direction with the arrow keys.
2. Choose Print from the File menu. You will be presented with a standard print dialogue box.

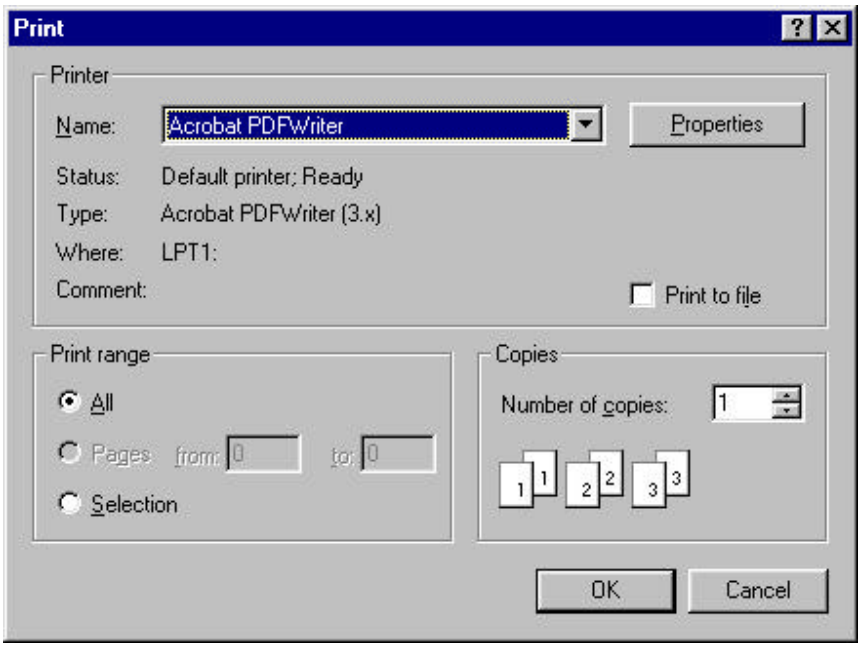


Figure 32: Print Window

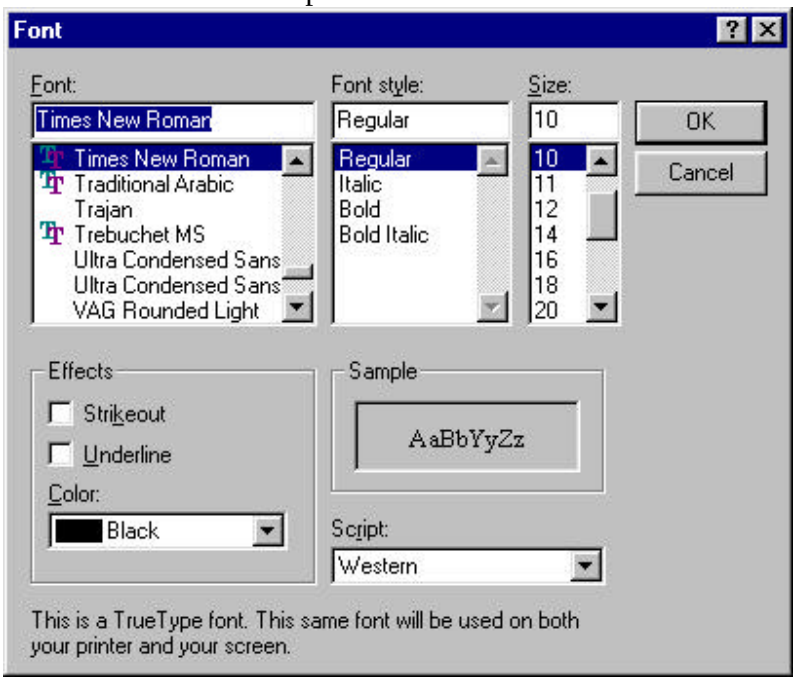
3. Select the printer you would like to use from the 'Printer Name' drop down list.
4. Every printer comes with options to allow you to change things like paper size and orientation (landscape or portrait). To access these options, click on the 'Properties' button of the print dialog. For more information on changing these settings, consult your printer's manual.
5. Select whether you would like to print the whole text or just the selected text.
6. Choose 'Print'.

Changing the font

Sometimes, you may find it useful to print something in a larger type or in a different font. Librarius allows you to change the font with which it normally displays and prints your text to any of the other fonts available on your system.

To change the font

1. Choose Font from the File menu.
2. You will be presented with the standard Font dialog box listing all the fonts on your system that Librarius will be in a position to use.



3. Choose the font, style and size you prefer
4. Choose OK.

Finding a word or phrase in a document

Librarius allows you to locate all the occurrences of a word in your document. To use this facility

1. Choose New Search from the Edit menu. You will be presented with the following window.

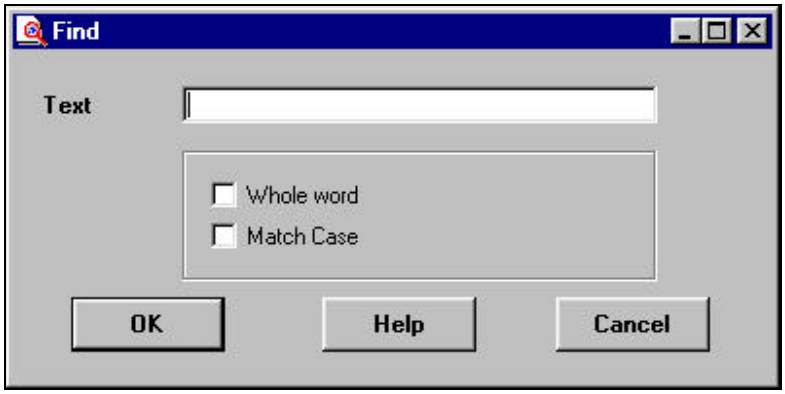


Figure 33: Finding text

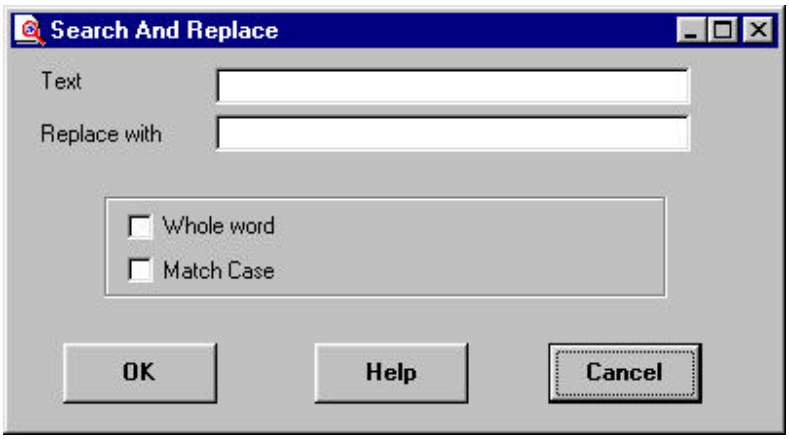
2. Enter the word or phrase you wish to locate

3. Specify whether Report Maker should only return matches that are whole words or phrases only.
4. Specify whether you would like Report Maker to consider the case when making its comparisons. If this option is not selected then Report Maker will interpret capitals and small letters as identical.
5. Choose OK.
6. To find any more matches press F3 or choose Find Next from the Edit menu.

Replacing every occurrence of a particular word or phrase

This facility allows you to automatically replace all the occurrences of a particular word or phrase. To do this

1. Choose search and replace from the Edit menu. You will be presented with the following window



2. Enter the word or phrase you wish to replace in the Text box.
3. Enter the word or phrase you wish to replace the text in (2) with.
4. Specify the search criteria i.e. whole words only and/or Check case.
5. Choose OK.

Inserting Dates and Text Files

To insert a date or text file in the document you are working on

1. Place the cursor where you would like to make the insertion.
2. Choose the item you wish to insert from the Insert menu. If it is a text file, you will be prompted to specify its file name.

Mail Merge

The Mail Merge facility allows you to prepare a standard letter and to have Librarius generate all the actual personalised letters automatically. To start Mail merge

1. Start the Report Maker or if you are already running the report maker, choose New Session from the File menu.
2. Choose the mail merge option from the Session window
3. You will be prompted to specify an SQL source file. This file must contain the SQL you wish to use as the basis of you mail merge. For example if you want to mail all the people with expired subscriptions then the file must contain SQL that lists all the expired subscriptions. An example of an SQL source file is in your report directory under the name Expired.SQL. This file picks out expired subscriptions.

It is advisable to create these files in the SQL utility and to test them before saving them there to avoid problems.

After you have started the mail merge, you can prepare a standard letter warning all subscribers with expired subscriptions of the need to renew their subscriptions before a given deadline. Mail merge requires that you specify where the personalised details are to be inserted. To do this

1. Place the cursor where you would like to insert the personalised detail like a name
2. Either
   - Choose Insert merge field from the Mail merge menu. The following window will appear with all the available fields in the list.

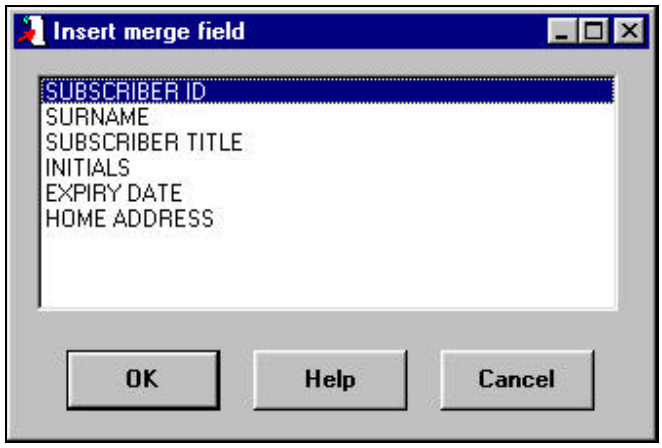


Figure 34: Inserting a merge field

   - Choose the field you wish to insert from the list by clicking it and the choosing OK

3. Or
   - Click the right mouse button. A pop up menu with all the available fields listed in it like the one shown below will appear. You may need to click the right button twice.

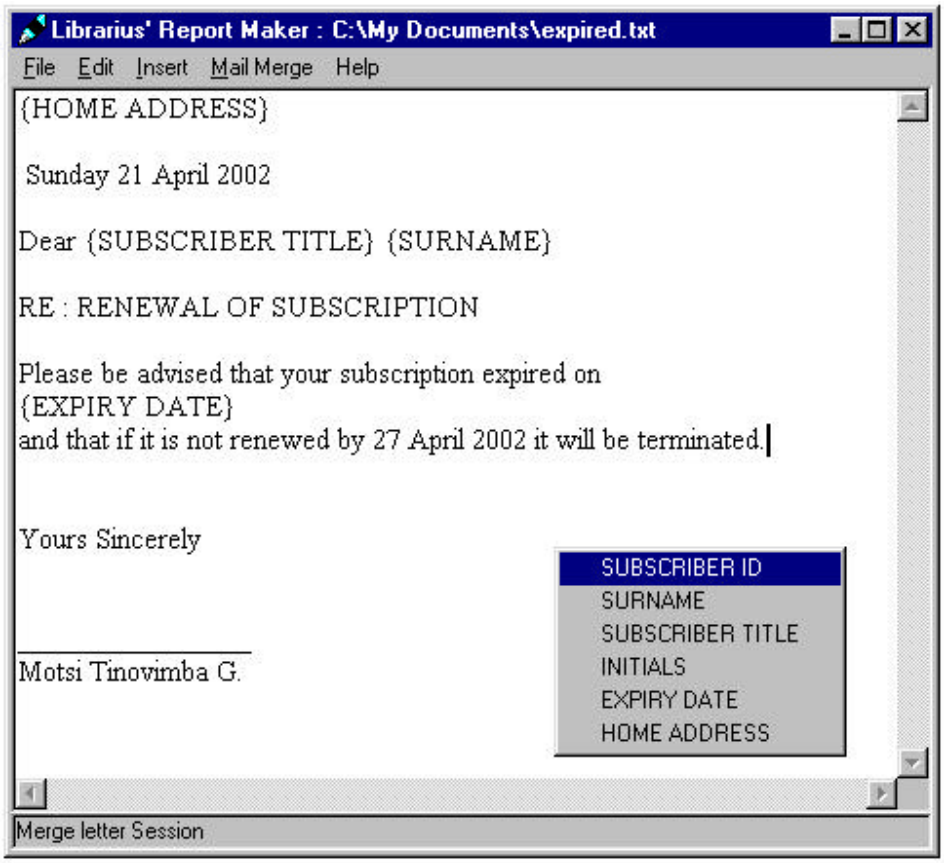


Figure 35: Merge Session with Pop Up Insert Field Menu

   - Choose the field you wish to insert from the menu.
4. The field name will the appear will be inserted surrounded by set brackets i.e.{}.

You should never type in brackets in normal mail merge text as this will result in the system interpreting the text between those brackets as Fields and flagging errors.

5. Once you have finished composing the standard letter, choose Begin Mail Merge from the Mail Merge Menu.

Reports

The report facility allows you print out reports based on SQL results. To build report

1. Start Report Maker or if you are running the Report Maker choose New Session from the File menu.
2. Choose the Report Making session and click the OK button.
3. Enter the filename of the SQL source file created using the SQL utility. If the query file is valid, your report writing session will be started otherwise a text editing session will be stared instead.
4. Type in the Report header e.g. Report of expired subscriptions on 02/08/2000. The header may contain as many lines as you wish it to.
5. Select the report fields you wish to print in the order you would like them to appear in the report. To do this
   - Choose report fields from the report menu. You will be presented with the following dialog box

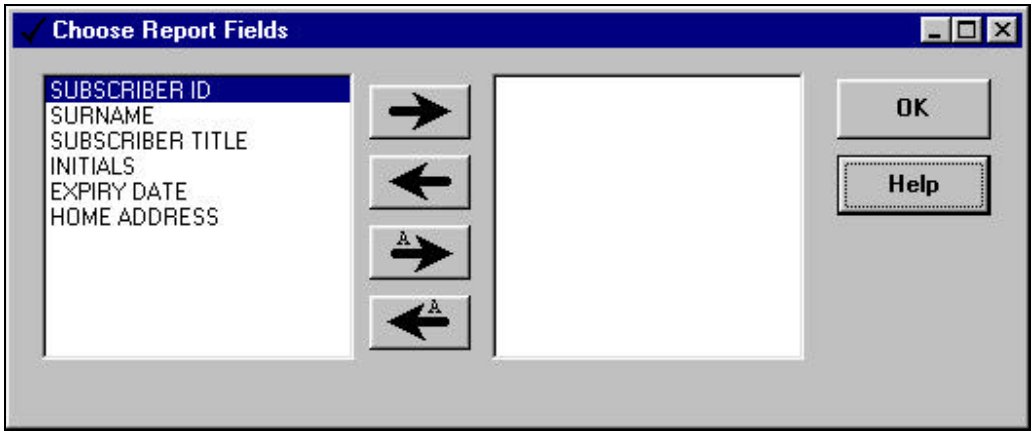


Figure 36: Choosing Report Fields

   - Click the field you would like to appear first in the report and choose the ➔ button. It will be moved to the Selected list.
   - Repeat the step above for all the other fields you would like to be included in the report bearing in mind that the order in which the fields appear in the list will be the same as their order in the report.
   - Use the ← button to return any field in the Selected list to the Available list. The ➔ arrow with the A above it moves all the fields in the Available box to the Selected list in the order in which they appear in the Available list. The ← arrow with the A above it moves all the fields in the Selected list back to the Available list.
6. Choose OK. You will then be presented with the following the 'Trim Fields' dialogue box. Use this dialogue to adjust the length of any of the columns. You may do this so as to shorten any particular details e.g. you can trim the surname to just 6 characters or you may increase the width of a given column if the system is having problem fitting the information in the columns it will have calculated. For example if surnames are not fitting in the 15-character column allocated to them, you can increase it to 20

characters. The fields marked N/A cannot be altered and the ones marked INCR can only be increased.

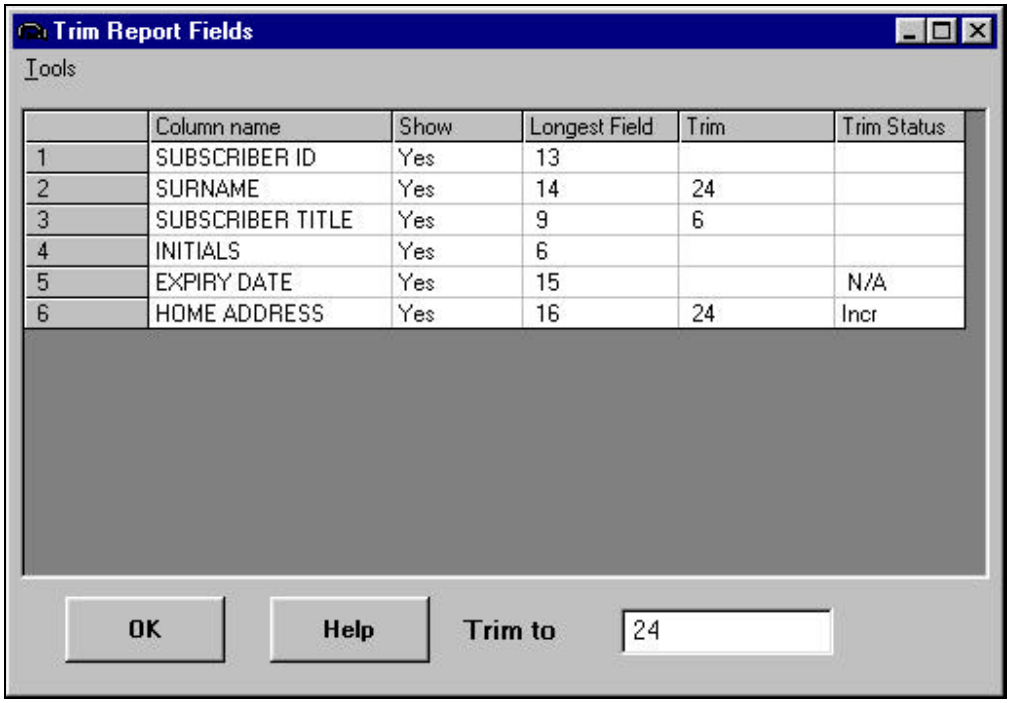


Figure 37: Specifying field width on paper

7. To adjust the field width on the printed paper
   - Place the grid cell pointer in the respective Trim field cell by clicking the cell
   - Enter the adjusted length in the trim to text box at the bottom of the window and press enter.
   - Use the tools menu to get statistics on the trimmed (adjusted) and unadjusted total widths and compare this with the paper width, also available from the tools menu. The adjusted total width should be less than or equal to the Paper Width or an error will result during the report building.
8. Choose OK.
9. Choose Build Report from the Report menu.
10. Specify the printer paper size and Paper orientation. See the section Printing a document under the Text Editing Section.

Chapter 6:

Setting Access Rights for Users 2 & 3

This facility allows the high priority user to determine the facilities to which the other two users will each have access to.

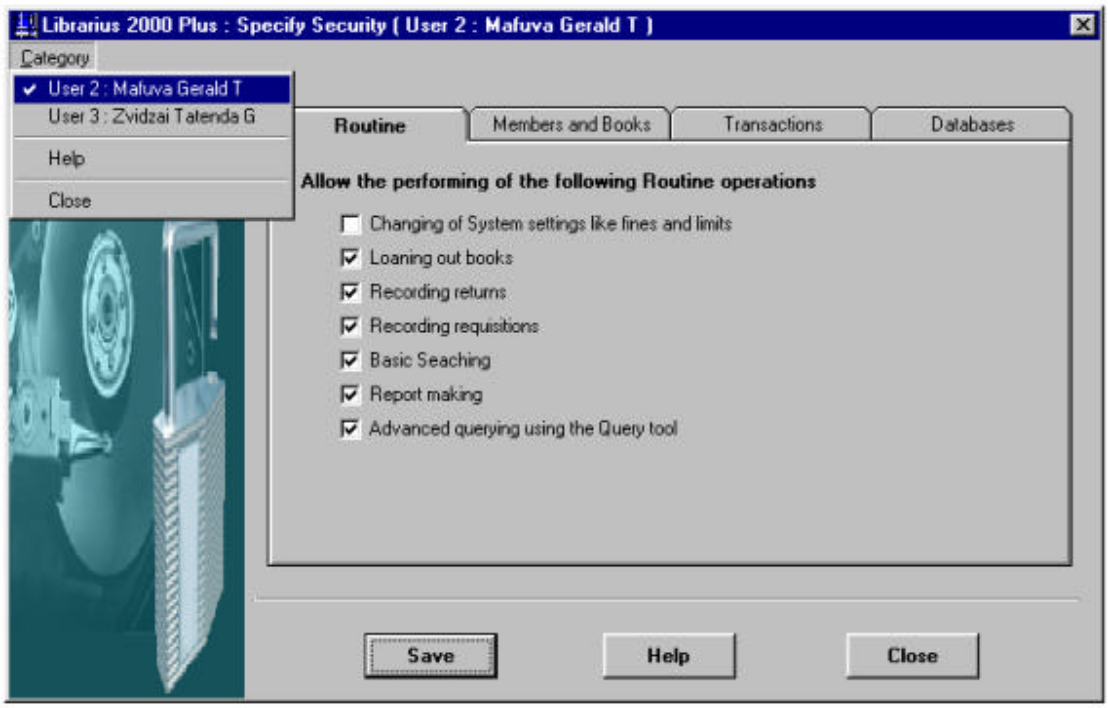


Figure 38: Setting Access Rights

The facilities are divided into 4 categories namely

- Routine tasks
- Data Management
- Transactions
- Database Management

To access a particular category, click its tab and its facilities will be displayed along with all the active settings if any. A check mark alongside the title of a particular facility indicates that the user will be given access to the facility. Click the check mark to switch it between marked and unmarked.

To save the displayed settings, click the Save button. If this will be the first time you will be assigning a particular user access rights, you will be prompted to confirm the creation of the new set of access rights. You should choose 'Yes'.

You can only edit the rights of one user at a time. To set the rights of the other user, simply choose his/her name from the Category menu.

It is important that you understand that you can only change or set a user's access rights **after** you have specified his/her name and access password in the Options window of the main program. See Customising your system in Chapter 1 for more information.

Chapter 7:

Keeping Track - The Transactions Manager

This utility allows you to keep track of all the data processing activities including the use of the system by different users. To access this facility choose Transaction Viewer from the Librarius program group.

The four transaction logs can be viewed simultaneously or one at a time. To view any particular log, chose it from the Transaction manger's Transactions menu.

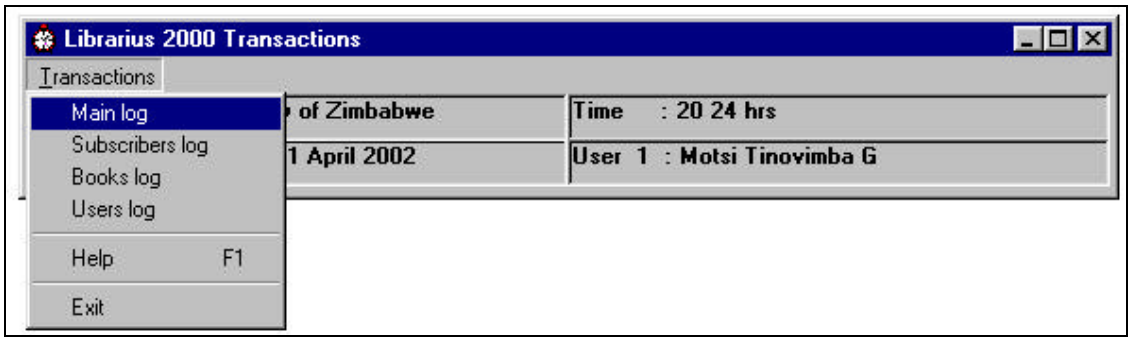


Figure 39: The Transaction Viewer

The Main Log

This contains a record of all the transactions relating to loans and requisitions. The extra date and amount columns are used as follows

Type	Extra Date	Amount
Borrow	Due date	Borrowing fee
Extend loan	New due date	Days extended by
Return	Date due	Fine if any
Delete loan	Date due	
Make request	Expiry date	
Process request	Expiry date	
Extend request	New Expiry date	Days extended by
Delete request	Expiry date	

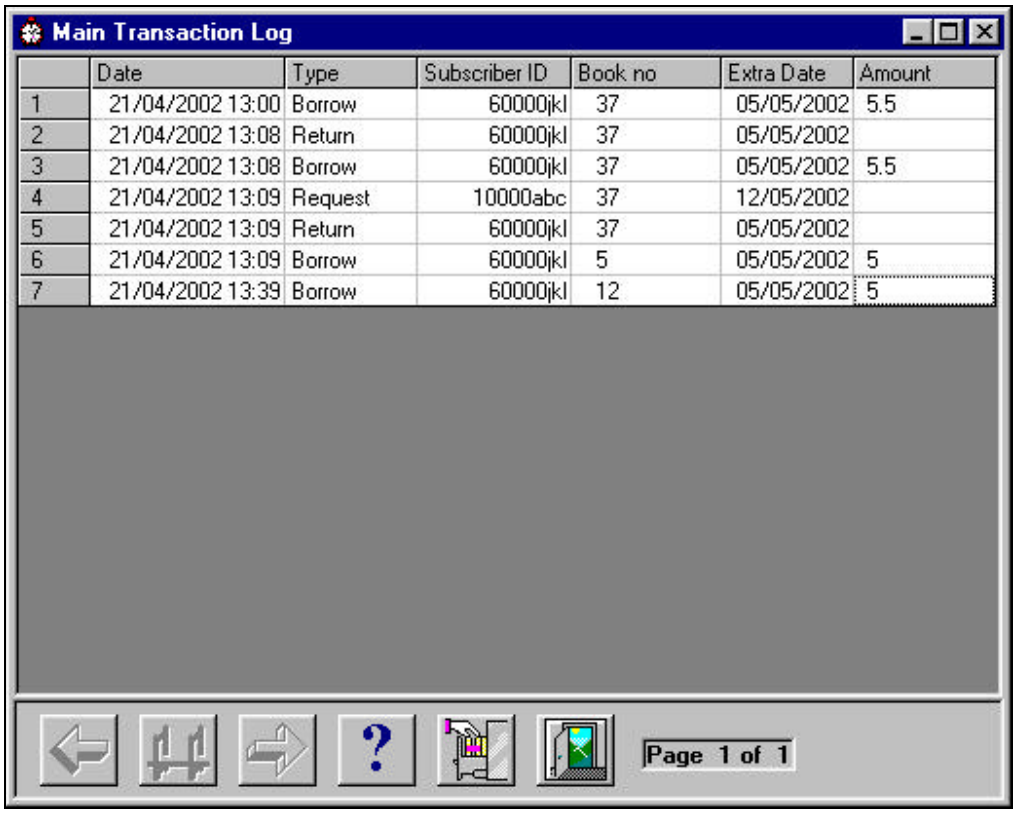
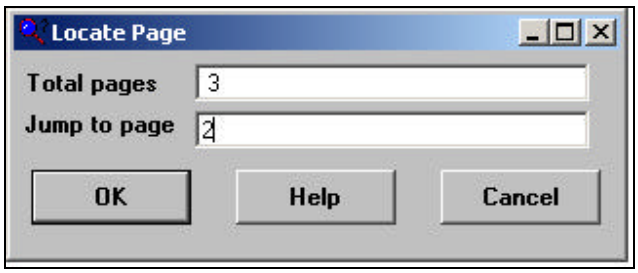


Figure 40: Typical transaction log Window

Each page contains 100 transactions. To view the next page, click the ➔ button. To view the previous page, choose the ➔ button. To jump to a particular page, click the 'Bridge' button. You will be presented with a dialogue box like the one shown below.



Simply enter the page number you wish to jump to and choose OK.

Filtering records

The transactions manager allows you to select the type of main log transactions to view using the filter window shown below.

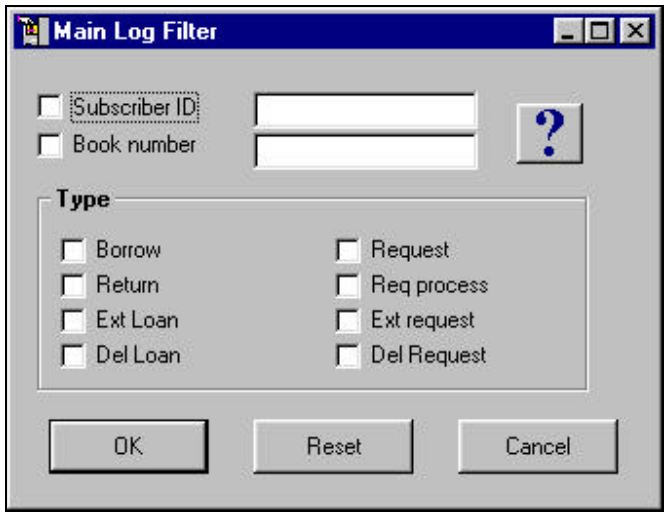


Figure 41: Specifying the transactions to view

To filter records,

1. Choose the filtering icon

2. Mark the transaction types in the Type box you would like too view. You must specify at least one transaction type for your filter condition to be accepted.
3. You can go further and limit the transactions shown to those concerning
   - A certain book by marking the Book number box and entering the book number e.g. all the transactions selected involving book number 16.
   - A subscriber by marking the Subscriber ID box and entering the subscriber code e.g. all the transactions selected involving subscriber ID 12345xyz
   - A certain book and subscriber by marking both the book number and subscriber box and entering both the book number and subscriber code e.g. all the transaction selected which involve both subscriber 12345xyz and book number 16.
4. Choose OK.
5. After you have finished viewing the results of the filtering condition you can return to the viewing of all the records in the log by choosing the filtering icon and then choosing the Reset button.

The other logs

The other logs are similar to the Main log if not simpler in structure and mastery of the Main Log form should automatically be extended to the other windows as well. One point to note though is that in the subscriber and books logs, in the edit transactions in particular, those transactions that would have been changed will be marked with a (c).

Chapter 8: Managing your databases

Optimising your databases

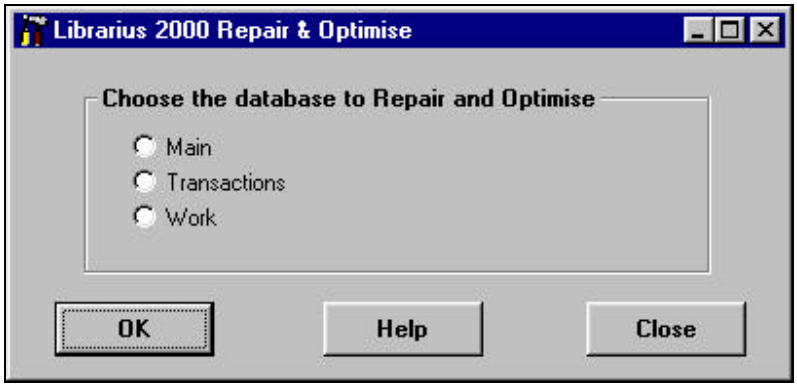


Figure 42: Optimising and Repairing

With time, the information in your databases will cease to be organised in what could be referred to as the best and most orderly way. As a result, the size of your databases will be actually higher that it should be and this will slow down access. To rectify these problems, run the Librarius 2000 Plus optimisation utility accessible from the Librarius 2000 Plus program group. Running this utility once every week should be result in satisfactory performance. This process however requires considerable working space and if you start experiencing disk space problems while running you should consider obtaining a larger hard disk. To carry out the optimisation

1. Choose 'Optimise & Repair' from the Librarius program group
2. Enter your product ID password
3. Mark the database you would like to optimise
4. Choose OK

Repairing the databases

No matter how reliable your system is, power failures and other disruptions that may result from an unlimited number of misfortunes may leave your database damaged. For this reason, you are urged to make frequent backups of your databases using the backup utility. The repair utility will do its best to recover as much information from your database as possible but a 100% recovery is rare. It is most likely that some information will be lost and if your system starts experiencing problems, it maybe better to restore a backup file than to work with the repaired databases.

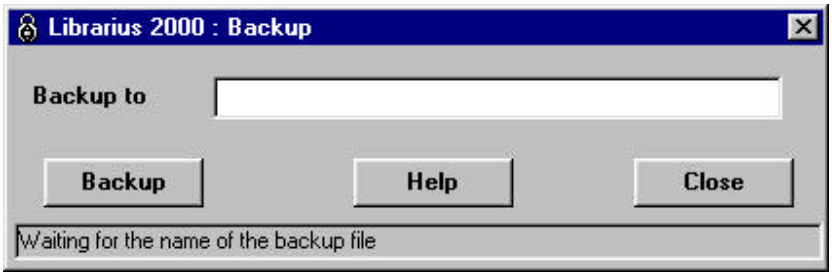
The repair utility is part of the optimise utility so repairing involves the same steps as Optimisation.

If only your main database has been corrupted and if you are sure that the Transactions logs are OK then your can guarantee yourself of a 100% recovery by doing the following

1. Repair the main database
2. Back up your database
3. Restore the backup file

You however may still need to make some manual corrections to the Setup table after this.

Backing up your databases

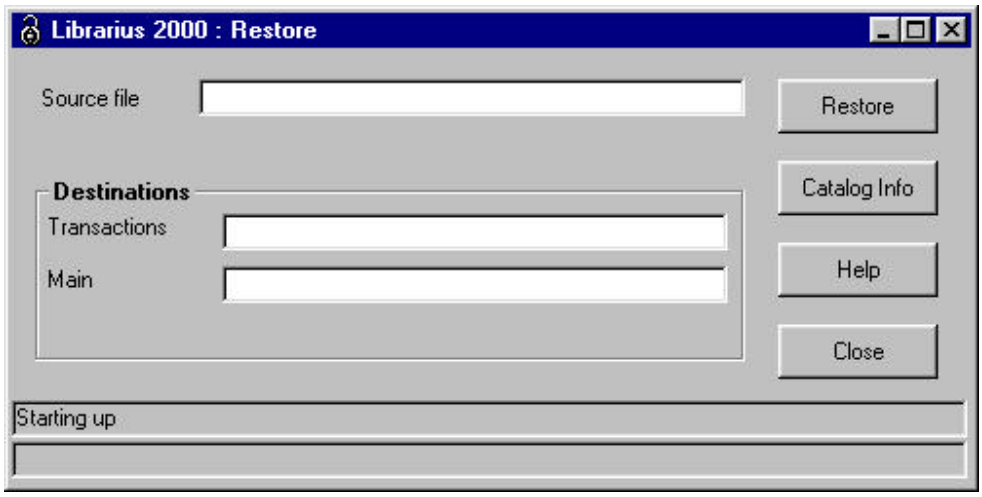


Because of the uncertainties that surround the maintenance of databases and the misfortunes that are bound to eventually befall you, the need to regularly backup your database can obviously not be over emphasised. The Librarius 2000 Plus Backup Utility allows you to make a single compact database roughly the size of your transactions database containing a backup copy of all your databases. The backup facility can however not backup your database to more than one disk i.e. once your transactions database is roughly 1.3MB, long you will no longer be in a position to back it up to a 1.44 floppy diskette. You can however backup your database to any disks recognised by your system including the hard disks. After backing up a copy to a location on your hard disk, you can transfer it to floppy disks using the Windows backup utility accessible from the 'Accessories: System Tools' group. For more information on how to use the Windows backup utility, refer to the Windows manual.

To backup your database

1. Click the backup icon in the Librarius 2000 Plus program group
2. Enter your password
3. Click the Backup to text box and enter the filename of the backup utility.
4. If you back up you file to the hard disk, use the Windows backup utility to backup the backup file to floppy diskettes.

Restoring your databases

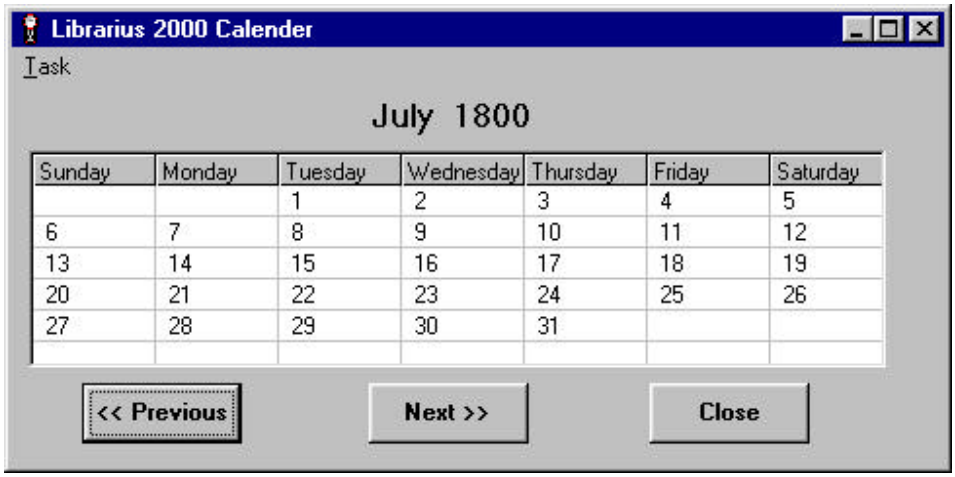


If your database should be damaged beyond repair, you can replace it with a backed up copy. To do this

1. If you transferred your backup copy to the floppies using the Windows Backup Utility, use the Windows backup utility to move the file back to the hard disk.
2. Choose the Restore icon from the Librarius 2000 program group
3. Enter your product password that is at the end of this user manual.
4. Click the Source File text box and specify the filename of the backup file
5. Click the Transactions text box and enter the filename you wish your transactions database to have. Do the same for the Main database.
6. To view the catalogue record of the backup file, choose Catalogue Information and to restore the database choose Restore.

Chapter 9: The Calendar Utility

The Librarius 2000 Plus Calendar utility provides you with an online calendar for the years 1800 too 2100.


Librarius 2000 Calender
Task
July 1800
Sunday Monday Tuesday Wednesday Thursday Friday Saturday
1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31
<< Previous
Next >>
Close

You can use the Next and Previous buttons to browse through all of the months in the above-specified range. Alternatively, you can 'Jump' to any month in the above-specified range by doing the following

1. Choose jump from the Calendar's task menu. After doing this, you will be shown the following dialog box.

2. Select the month you wish to jump too from the month list
3. Enter the year you wish to jump to. The year should be in the above specified range
4. Click the OK button.

At any time during the browsing you can jump too the current date by choosing Today from the Calendar Task menu.

YOUR PRODUCT ID PASSWORD
LIBRA 25081982

Please tear off this page and keep it in a safe place.

System Maintenance And Appraisal

Databases

All the database structures are described in details in the Design section

Modules

The structure of the modules is given in the design section with a detailed analysis of the interface, algorithms, and database tables accessed. The actual forms appear in the User manual. The only word of caution to the prospective upgrader is that there exist modules described under design that have been moved to global modules not explicitly mentioned anywhere in the text. These modules have a BAS extension and care should be taken when upgrading them as they are extensively shared. Also, some of the design documentation for these modules is quite outdated given the changes that they have gone through during development and testing.

Meeting the Objectives

The system meets all the specific objectives as follows,

1. The Subscription and Books modules assisted by the Terminated Subscriptions and Deregistered Books modules manage all the book and subscription records as to the requirements of Objective 1.
2. The Borrow, Return and Requisition modules with particular reference to their extensive validation routines achieve Objective 2.
3. The Database management tools comprising Backup, Restore and the Repair & Optimisation routines achieve Objective 3.
4. The Statistics routines in the Librarius' Tools menu along with the Query utility achieve Objective 4. The Search routines also contribute towards the achievement of this objective.
5. The Query utility, though unable to save the actual results, satisfactorily meets Objective 5 when assisted by the Report routines.
6. The Transactions utility's User log routines achieve Objective 6.
7. The Security modules achieve Objective 7 by assigning Users 2 and 3 different access rights.
8. The Setup Utility achieves Objective 8.

Opportunities for Improvement

Although it is clear from the above analysis that all the specific objectives as outlined in the Problem analysis have been satisfactorily met, there is still room for improvement in the following areas.

Installation

The setup program registers an error when trying to register msjro.dll. The cause and implications of this error need to be investigated and addressed. So far, the system has been noted to perform as to design despite this.

Setup

The set up process for the system should be integrated to allow the user to install, configure databases and set the default setup table values in one go. The more integrated the system, the less room there will be for errors.

Subscriptions and Books

It has been noted that the system of maintaining schemes through individual book and subscription records is not very conducive to change. A proposed alternative to this would involve the creation of a scheme table that would define limits and charges. An individual book or subscription record would then be linked to a particular scheme thus allowing all the records to be updated by just updating the scheme table.

Loans and Requisitions

Most libraries issue out receipts when fines and borrowing fees are paid and it is believed that incorporating this into the system would be beneficial. In addition, some libraries maintain prepaid accounts from which borrowing fees and fines are deducted and this should be incorporated into the next version.

Direct SQL

Most users are quite uncomfortable with SQL and since the range of SQL allowed in Librarius is quite limited, a user-friendlier interface should be considered. This interface would probably adopt a Wizard interface that would allow a user to specify the details for each SQL statement by selecting fields from a list.

Reports

The reports utility should incorporate a facility for saving reports. The saved report file would probably include details of the SQL, fields chosen and their trimmed lengths. In order to discourage direct editing, this file would be held in binary format.

Users

The system should allow the primary user to declare as many users as required. In addition, the utility for setting individual user rights should be incorporated into the Options window. Starting it up on its own is rather inconvenient.

Transaction Logs

Although the format for holding the main transactions is quite convenient space wise, the main log is quite difficult to read. Ways of improving o this should be explored.